

JUNIOR-SENIOR HIGH SCHOOL CLEARING HOUSE

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EDITORIAL

The building and equipping of schools is an art. Art cannot be standardized; neither should school buildings nor equipment. Communities vary in their ability to build as they vary in their power to visualize. As communities visualize so they will build. School buildings are temples for learning how to live more abundant lives and should be beautiful as well as serviceable. Classrooms conveniently arranged to promote freedom with responsibility and equipped and decorated so as to create a happy atmosphere contribute much in the wholesome development of boys and girls. Corridors, playgrounds, auditoriums, swimming pool, cafeteria, and all other features of the modern school which play a large part in the realization of the social objective in education are essential. Artists are needed to build school buildings in keeping with the needs of youth whom they serve, substantial, modern, inspiring, adequate, beautiful.

Beautiful buildings are not elaborate, ornate, or extravagant; buildings can be made beautiful with simplicity, effective with arrangement and planning, impressive without elaborateness, serviceable in the development of ideals without extravagance, and complete in provisions for the development of the bodies, minds, and souls of children, if planned by those who understand children and their needs.

The day is past when politicians should plan school-building programs for their communities. Trained school administrators are needed who know children's needs. The day is past when any architect can build a school. The school-building specialist is needed. The day is past when the principal, superintendent, or purchasing agent can plan classrooms efficiently. The specialist in his particular subject field is the one who knows best how to plan a room in which his subject can be efficiently taught.

Beautiful school buildings harmonize with their surroundings, serve adequately the needs of boys and girls, help them to appreciate life in its varied settings, and crystallize those visions of service, loyalty, duty, and love which take form in the hearts and souls of the builders.

SCHOOLHOUSES OF YESTERYEAR

Your old school building and mine are beautiful to us. In our dreams of yesterdays they stand out fragrant with pleasant memories. Let us build anew so that our youth of today may remember tomorrow their temples of learning which were so built that their needs were adequately served.

DREAMS

When dreams come in the twilight
 To take me back again
 Counting the milestones, one by one,
 That border life's long lane,
 I see myself, a little lad,
 Freckled, and patched, and brown,
 But, O I know no happier boy
 Was ever in our town.

Each milestone had its roses:
 The old grey house at home,
 The tall, white church spire in the trees
 The quaint, old courthouse dome,
 The morning-glories clustering,
 The singing birds at dawn,
 The trout-brock in the alder lot,
 And the sounding dinner horn.

But dearer than all else, I think,
 Except my mother's smile
 Was the little schoolhouse on the hill,
 Beyond the wood and stile.
 Its battered seats and blackboard,
 Its rough and knotted floor
 Are as fragrant in my memory
 As the roses round its door.

We had a baseball diamond
 Smooth-worn by many feet,
 And behind, a field and piney woods
 With fragrant carpet sweet,
 And the scent of brown, pine needles
 Drifts back across the years
 To make my memories sweeter
 Under the mist of tears.

And when the shadows lengthen
 And the path ahead grows dim,
 I shall catch, beneath my starlight,
 Just a little backward glim.
 For the vision that will come to me,
 The last one I shall see,
 Will be the schoolhouse on the hill
 Just as it used to be.

—Frances Wright Turner
 H. H. V. C.

DO ELABORATE SCHOOL BUILDINGS DEVITALIZE EDUCATIONAL ACTIVITIES?

Many administrative minds get sadly sidetracked when they concentrate on problems of school buildings and grounds. Questions are so specific, costs and values

lend themselves to such accurate calculations; the amounts of money involved are sometimes so gigantic, that the importance and significance of corridors, locker rooms, and auditorium seats are seen in a dazzling mirage by all but well-balanced administrators.

It is healthful for us school people to withdraw ourselves from the blueprints and bids and inspections occasionally. To do so may help us to meditate on the meaning of community life and of social expectancy. We may find thus an almost religious mood, a humbleness in the face of the implied responsibility of school people to whom the community entrusts its children, and in whose program the community shows its faith in the typically American manner of backing it with a half-million or a million-and-a-half dollars expended on one building.

The American architectural scene is in no other way more challengingly affected than in its school buildings. From Maine to California and from Washington to Florida, literally thousands of beautiful new schools have appeared. Often these buildings have broad landscaped grounds, beautiful doorways, adequate playgrounds and automobile parking spaces, elaborate offices and libraries, spacious auditoriums, gymnasiums, and cafeterias, home-economics suites, well-equipped shops, music and art studios, science laboratories, rest rooms, clubrooms, room telephones, and radios, moving-picture booths, scenery-shifting apparatus, and much other equipment for the encouragement of the education of youth.

It was Thoreau who asserted that things do not so much belong to us as we to things. It requires steadfastness of purpose and sound perspective for the high-school principal to restrain himself from degenerating into a business manager. Our material "blessings" have brought us material responsibilities. To head up the work

of our deans, janitors, librarians, shopmen, laboratory teachers, nurses, and coaches makes such tremendous demands on our energy and time that we frequently content ourselves with oversight of schedules, equipments, and reports. These are all of primary immediate importance. But they illustrate with pitiable accuracy the truth of Thoreau's assertion.

Cafeterias become so elaborate that pupils can have no part in their operation, managers and assistants must be hired to prepare and serve food while docile pupils pass by with their trays and make their purchases. Librarians are employed to arrange and care for books and maintain library atmosphere in beautifully furnished reference rooms where pupils consult tomes under the supervision of experts. Laboratory apparatus is so expensive and delicate that only the instructor or his paid assistant dares set it up; shop machines are so involved and dangerous that a teacher must be present each time one of them is used. The stage lighting system is so complicated that only an expert may use it. Swimming instructors must personally direct all activities in the pool.

Our magnificent buildings are an expression of community faith. They foster community pride. They serve as aesthetic standards for community beauty. They increase the value of real estate. *Do they promote or retard pupil responsibility? Do they impersonalize and mechanize practices which under the less mechanically perfect conditions of earlier schools were often very highly educative?*

The writer of this editorial frankly admits that he has not adequate data on which to base an answer. He recognizes that super-busy and meticulous administrative-minded principals would devitalize and mechanize even a rural school lunch hour. He does believe, however, that high-school faculties who inherit a beautiful new school need a combination of a humble and a contrite heart and a penetrating, aggressive intelligence and a determination that they will do nothing and allow no one else to do anything for pupils which through reasonable stimulation and advice they can be led to do for themselves.

P. W. L. C.

CLASSROOM AND CORRIDOR ARRANGEMENTS FOR EFFECTIVE SCHOOL WORK

EUGENE RANDOLPH SMITH

EDITOR'S NOTE: Mr. Smith is headmaster of the Beaver Country Day School, Chestnut Hill, Massachusetts. He is the author of Education Moves Ahead. Mr. Smith is a former president of the Progressive Education Association.

D. I. M.

Auditorium, workshops, gymnasium, special rooms of various kinds, all are important parts of the school building—but the classrooms are its very heart. Two major considerations enter into the planning of classrooms, the type which the classroom shall be, and the placing of classrooms in orientation and in relation to other parts of the building.

It may seem trite to repeat formulas or to state fundamental requirements for a good classroom, yet tremendous sums of money are being spent each year on buildings that fail to meet the elementary specifications for good living and working conditions for children. Briefly stated, a classroom should have from 20 to 30 square feet per child, with a ceiling normally about 12

feet high. The younger the children, the greater the need for space in which they can move easily and can carry on activities suited to their ages, but senior-high-school pupils can use to good advantage even the maximum area, although school systems usually cannot yet afford to give them such favorable conditions. The room should be rectangular with light on the long left side. Windows should have about one fourth of the floor area and should be in a solid bank reaching to the ceiling and practically to the back wall, but leaving about six feet of windowless wall at the front.

There are several common offenses against this. In the first place most classrooms have too little window space. My own opinion is that, judging from the trend of recent investigations, it will eventually be proved that the most liberal standards of today are far below the optimum condition for unstrained use of the eyes in close work such as studying, and that more light will mean greater efficiency in work, and less ill effects in later life. Many buildings have windows that were placed by architects so as to give the balance desired for the outside of the building, with little or no regard to the effect on the inside. Consequently they have windows that are so placed that they make blackboards glare; or that, on account of wide wall spaces between them, make bands of light and shadow across the room; or that fail to reach near enough to the ceiling to take advantage of its reflecting possibilities, or to get the longest possible light across the room. One has only to draw parallel lines from the sun direction through the top and the bottom of a window to see the unbelievable difference in the illuminating values of upper and lower parts of a window. The usable width of a room is, in general, about twice the height of its

windows; further than that the light does not carry effectively.

To use even good window lighting, the room must have a color scheme that is suitable, and, fortunately, investigations of the advantages and disadvantages of various colors and combinations of colors have given considerable data for wise decision. There is no question that the ceiling should be very light, either white or near it, and that color should increase towards the lower part of the room, all that comes below the child's eye being dark enough not to reflect strongly. The combination that has most authority supporting it has a white or slightly cream colored ceiling, a light buff wall, somewhat darker below the blackboards, and dark floor and furniture. A soft blue for windows gives a pleasant contrast. That the surface finish should be soft enough not to allow glare is evident. A plaster slightly roughened, not enough to catch dust unduly, is sometimes recommended.

Coat closets that are a part of, or are connected with, the classroom are no longer considered the best practice. The most convenient and least open to criticism of the arrangements that are being tried puts compartments for out-of-door clothing into the corridor walls, each classroom having its space outside its own room. By making the compartments about two feet deep, giving each child a coat hanger fastened at right angles to the corridor, a hat peg or hook, place for rubbers and umbrella, and a storage compartment about $5\frac{1}{2}$ by 12 inches, it is possible to accommodate all the children of a classroom in the stretch of wall between the two doors which a classroom should have at the extreme front and back. It is necessary to allow about seven inches to a pupil in planning such closets.

The best way of covering these coat closets is by paneled doors that fit into the scheme of decoration of the corridor and

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work like the doors on telephone booths, pushing back entirely out of the way when the pupils are using the closets and making a wall without openings during the rest of the school days. Such doors make it possible for all the pupils of a school to have access to their out-of-door clothing at the same time, with a minimum use of floor space.

These closets are of course attached to the ventilating system, usually having air drawn in from the corridor through grills in the doors and carried out through overhead ventilators.

It is very important that a classroom shall have adequate display space, and ample room for the storage of supplies of various kinds. The display space can well be cared for by having the back wall covered with a cork display board in place of blackboards, and by having a strip of corkboard built in over the blackboards on the front and right walls. Cupboards can be built into the wall on the hall side if the room is of a size to allow this in addition to the coat closets in the hall. It may be necessary to provide shelves in the classroom, or to do both.

The orientation of classrooms has provoked much discussion, but careful experiments seem to have fairly well established what is good practice. One investigation went so far as to set up a model classroom on two rotating platforms, with a searchlight sun on a vertical arc. It could therefore be set in the correct direction from the sun for the time of year in question, and could then be rotated into various orientations. The inside of the room was covered with a paper set in for each trial, so the sun exposure for any hour of any day could be determined and recorded with great accuracy. In this way conditions for various orientations were plotted, and decision was made on the results shown. For the eastern United States from Baltimore to Boston approximately eastern exposure

is most desirable for classrooms. A slight change to the south of east as one goes north and to the north of east as one goes south if possible, and probably desirable. The next best orientation is west, with a reversal of the modifications mentioned. There is not space for a full discussion of the reasons for this except to say that in both of these orientations the rooms are sunned at some time of day, but with a minimum necessity for the use of shades during school time. It should be added that in rooms given over principally to activities that do not demand too close eye work—such as kindergarten and first primary rooms—southern exposure is good, and light may well come from two or three sides, if care is taken that the children do not face glare.

A very important question concerns the keeping of pupils' books and other school material. The organization of the school determines this to a large degree. I still favor having each pupil assigned a movable desk and chair, fitted carefully to his size, in a homeroom where a considerable part of his time is spent when he is not in special rooms designed for special uses. The only important disadvantage is the fact that this does not dovetail use of the rooms in a way to keep the overhead per pupil as low as possible. When it can be afforded, I believe the advantages are worth the cost, for a school, after all, is not a factory, and the psychological values of a home desk, a homeroom, and a friendly home teacher are worth considering.

Where this is not possible, locker systems seem to serve the purpose best. Unfortunately lockers are space devouring, they are ugly, and they are very difficult to keep clean. When possible they should be in locations accessible without crowding, such as in the corridors along the special rooms, and in corridor bays not used for passage. As far as I know, no school has tried covering them by doors such as I have

described for the coat lockers, but I believe it would add enough to corridor attractiveness to pay for the slight additional cost.

Corridors are usually an unattractive feature of a school building. They are often wider than traffic really needs, are so high as to lose any sense of intimacy, and are of a cold and rather forbidding color. Perhaps no part of the building does so much to give an "institutional" effect. Percentage of corridor space has been worked out for public-school buildings, but that does not help greatly for individual corridors. The traffic load must determine the width necessary, and main corridors must be much wider than side corridors that carry traffic to a limited number of rooms with no considerable peak load.

It is often possible and desirable to carry ventilating ducts and other such accessories along the top of a corridor space, lowering the ceiling for the purpose. There is also no reason why bright and cheerful color effects should not make passages attractive and intimate, with an immediate improvement in the effect given by the whole building. If the floors are of linoleum, cork, rubber, or some such soft material, the pleasing effect is increased, and noise is largely obviated.

Limitation of space prevents the discussion of many other important factors such as ventilation of classrooms, lighting of corridors, etc., all of which should be given careful consideration in building planning.

EQUIPPING FOR VISUAL EDUCATION

DANIEL C. KNOWLTON

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D. I. M.

The problem in the field of visual education is no longer one of convincing school people of the value of visual aids. The more complicated their form, the greater their confidence in their power and effectiveness. It is just this situation which makes the problem of equipping the school for visual education one of the most difficult. An illustration will suffice.

During the summer of 1927 the writer had occasion to visit eighteen summer schools in the interest of visual education. The schools were selected for their representative character and furnished a fair sampling of the various sections of the country. It was proposed to conduct a series of conferences of those interested in the historical motion picture. From the

point of view of attendance and enthusiasm they left little to be desired. Fifteen hundred persons handed in their names as an indication of a desire to coöperate in making this material available in the schools. The only question ever asked was, "How can we get this?" The question as to its value or effectiveness as a classroom aid was apparently farthest from their thoughts. And this was the general attitude, in spite of the fact that the only proofs of effectiveness available were the studies made by Weber and by Freeman and his associates, which were necessarily limited as the result of the materials used and the nature of the work undertaken. It is safe to assume that comparatively few of those present at the conferences were

aware of the nature and extent of these findings. Their own receptivity rested on an entirely different set of data which could be briefly summarized as their own contacts with the theatrical motion picture and its increasing vogue among young and old.

The classroom teacher has found it impossible to ignore the "movie" as it has tightened its hold upon the boys and girls of the present generation. An interesting illustration of this is on the Continent appeared in an article in a recent issue of the German periodical *Gegenwart und Vergangenheit*, the magazine which corresponds to the *Historical Outlook* in this country. This writer has no brief for the educational motion picture as such. The burden of his plaint is rather the necessity for the recognition by the teacher of the more or less regular attendance of the adolescent upon motion-picture performances. He points out how the better class of theater pictures may be capitalized in the classroom, thereby injecting a real interest and enthusiasm into a rather blasé and sophisticated group of youngsters.

It is not the province of the present writer to trace recent developments in the field but rather to emphasize the fact that the school is by and large committed not merely to the motion picture but to visual instruction in general as one of the most effective means of realizing its mission. To use the parlance of the world of business, the schools are completely "sold" to the idea. This does not mean that effective programs are already in operation; it does not mean in many cases even the initiation of such a program. It is merely a credo—but one which carries with it a very sincere desire on the part of believers to do something in the light of it.

When these same enthusiasts, however, are confronted with the expense involved in providing the more complicated forms

of visual materials and visual apparatus, their enthusiasm begins to wane. This is not due to any doubts as to the effectiveness of the equipment. By no means! It has never entered their heads that this material could fail, once it was released for classroom use. All that is needed is the material and all recent experimentation to the contrary, there is a tacit assumption that now the teacher may abdicate her position and the visual aids will rise superior to the teaching, however ineffective. Those who have made a serious study of the instructional aspects of the use of visual aids are well aware that many of our present teaching techniques will have to be abandoned and others will need to be profoundly modified if a program of visual instruction comes into its own—as there is every reason to believe it will. It is for this reason, if for no other, that those entrusted with the purchase of visual equipment will act wisely in thoroughly appraising the situation on the instructional side before investing funds in expensive equipment.

For this item of cost, or expense, is closely, if not inseparably bound up with that of effective use. The best material in this field, as is true of laboratory equipment (much of which is visual in character), means a heavy outlay of money. Such an outlay will bring returns only in so far as the classroom teacher proves herself a master of these new forms of material and makes them serve her. It should be borne in mind that such success as has attended her efforts heretofore has been derived largely from the effective use of textual material, manipulated so as to yield a maximum of informational results. The aids which she is now expected to use represent a different contact with the world of knowledge, a contact which accompanies seeing and feeling. This being the case it naturally follows that her teaching procedures will be profoundly modified. About the

worst thing which can happen to a school—and in some cases, unfortunately, it has already taken place—is to invest heavily in visual material and fail to realize on the investment because the teaching staff has failed to grasp the nature of the new tools entrusted to it. If the visual materials which are now gathering dust in countless classrooms throughout the country could be reclaimed they would reveal a vast amount of admirable equipment which has lacked only the teacher's touch to give it effectiveness. The weakness was not in the instrument but at the very heart of the system, in the classroom itself. On the other hand, much of this has been deservedly scrapped, but here again the teacher has been at fault in seizing upon something which represented rather the "form" than the "substance" of an effective visual aid. Neither the firm which produced it nor the teacher who used it knew what was wanted. The schools themselves are largely responsible in the last analysis for a lack of adequate materials in this as in other fields. One large motion-picture concern might be cited in this connection as already having spent substantial sums of money with comparatively little return for its efforts. The "felt need" has too often been lacking both "form" and "substance." The expression is often heard, "We must educate the schools to this. We shall have to tell them that this is something which they want, or something which they really need."

The schools are now being subjected to an increasingly rigorous scrutiny as to the results which they accomplish. Merely book results will not answer. We are warned of the peril of the "textbook mind." Education must be in terms of life. This has been said *ad infinitum* and *ad nauseam*. It acquires, however, new significance when it is translated into the terms of a visual program. A visual program is nothing

more or less than an attempt to get next to life and to life's activities through actual experience, real or vicarious. Much of this is brought close to us as the result of seeing and feeling. We are reminded of Kipling's *Tomlinson* as the poet attempts there to distinguish between "what is read in a book" and the actual contact with experience. The advance of photography, the vogue of the pictorial, have made it possible to place ourselves close to the experiences of the race in such a way as to relive them and to reexperience them. Time and place are annihilated, and instead of having to trust to symbols which present so many difficulties in interpretation, the situation itself is before us and we can become a part of it without recourse to something which so often serves as a barrier to separate and isolate us. A familiarity with this kind of contact, an economy in the use of the most effective aids to realize it, are a part of the necessary concomitant of an adequate visual equipment.

The junior high school by its comparative newness has an advantage certainly over the senior high school in being particularly receptive to materials of this type. Here the boy or girl is to have the opportunity to which each is fairly entitled, that of trying out his powers and abilities and of truly "finding himself." What have been called "academic" means will be used in this connection, but there will also be an increasing number which cannot be so classified. These boys and girls will be brought as close as possible to experience itself and the road traveled will not be merely that which the textbook offers.

In spite of this receptivity to new materials and to new contacts it behooves the junior high school to walk circumspectly when it is a question of inaugurating a visual program with expensive visual apparatus. Better a bit of equipment which meets a very felt need and fits into the pro-

gram sponsored by the junior high school, than materials which may merely serve as bits of classroom decoration.

The visual-instruction movement, old as it is, is in its infancy so far as the schools of today are concerned. The use of one visual aid effectively will lead to the use of others. Each probably has its place; each has its peculiar contribution to make. In the present ignorance of what this place may be, the teacher will do well to concentrate upon the simpler forms and the principal should follow her lead in equipping the school with them. How can a school function successfully here when there is not even adequate bulletin-board space provided in its classrooms for the collection and display of visual materials? Schools will do well to see to it that they are provided with adequate apparatus for the projection of the ordinary lantern slide or with stereoscopes and stereographs for classroom use, before they reach out for the motion picture and the motion-picture projector. Better an adequate and effective collection of charts and maps and their effective use, than a plunge into the problems of effective projection of pictures in the classroom. All this is not to be interpreted as an argument against using the various forms of visual aids side by side, but to direct attention to the lack of a visual background in so many cases where the more complicated and therefore the more difficult visual aids have been introduced.

Some teachers and misguided enthusiasts have been under the misapprehension that if a school could equip its auditorium for the motion picture and its pupils could be herded there regularly to see them—such pictures for example as the better types of historical photoplays, or selected science films—the results would be so beneficial that they could fairly claim to have inaugurated a true visual program. A careful checking of such auditorium showings be-

tween groups which were seeing pictures in the auditorium in connection with the work of the classroom and those seeing them in the classroom, even though the same motivation was attempted, reveals such an advantage of the classroom type of projection over the auditorium that it raises serious doubts as to the wisdom of any considerable expenditure of school time in the auditorium if instructional results are sought. If this be true, then the school may well look to its practices, and be even more careful in taking the first steps in this field.

The teacher who makes no use of an effective textbook illustration or who seldom takes a bit of chalk in hand to illustrate her point on the blackboard, the teacher who gets along very comfortably, year in and year out, without a single historical map or wall chart, is not likely to make a very effective use of the motion picture. A teacher who seldom affords the child an opportunity to give expression to the workings of his imagination, crystallizing in some form the many images floating through his brain—either in words or in drawing—is not to be depended on to use projection apparatus effectively or to justify large expenditures for visual material.

The equipment of a school for visual instruction is largely a problem of the teaching staff. The day we hope is not far distant when there will be more adequate training provided in normal schools, teachers colleges, and college departments of education. The work in the various school subjects, other than the sciences, must take on more and more of a laboratory character where the creative abilities are stressed rather than the merely imitative, if visual equipment is to justify itself. The teacher who has caught this vision of the possibilities of the classroom may be trusted to make a wise use of visual aids.

The effort thus far has consciously been in the direction of laying down general principles which should govern those whose task it is to select visual equipment. The practical question of just what an individual school ought to purchase has been purposely avoided. The day for the widespread and effective use of this material has dawned but there is still lacking sufficient data on the instructional side for a selection of particular types of visual aids. The program for the purchase of such materials may well be a cumulative one, starting with adequate provisions for the classroom in the way of floor plugs and bulletin boards (which should fill a large part of the available wall space), adequate provision for projecting pictures either on a portable screen or the wall; a portable bulletin board for the display of individual pictures or diagrams, or the results of the work of pupils; adjustable hooks for the generous display of charts and maps (this is facilitated today by a type of rail which makes possible the hanging of maps and charts with differently spaced eyelets), adequate storage space for small pictures, charts, and maps; provision for filing pupils' work of this type, etc., etc. The newspaper illustration, the advertisement, the poster, carefully selected groups of slides and stereographs, built up on the unit principle; *i. e.*, selected with a view to the effective presentation of certain topics or important phases of the subject, may well serve as the nucleus of an equipment which is bound to grow and to assume more complicated forms as these prove their value.

The purchaser of such equipment would do well to acquaint himself with its latest forms. Those who have not followed developments closely will be agreeably surprised at the progress made. This may be illustrated by citing the newer forms of map material, both in chart and slide form.

Hundreds of maps and charts may now be conveniently filed in folded form and be ready for use on a moment's notice. The slide map projected on the blackboard in its various forms has much to commend it. The difficulty with the vast amount of visual material possible is that of making it readily available when needed. In the first place these aids must fit closely the course of study and they must be ready to hand at a moment's notice. The experience of such a pioneer in the picture field as the Newark (N. J.) Public Library is of special value in this matter of classification and distribution.

The problems of projection and the instructional values of the projected picture should be carefully studied before investing in projection apparatus (see for example the pamphlets published under the auspices of the New York State Education Department under the direction of A. W. Abrams). Projection is being rapidly improved and the output of competing firms should be carefully compared. Portability, simplicity of operation, and a maximum of illumination, should be the final tests of such equipment. That projection work which can be carried on with a minimum of classroom preparation is likely to prove most effective. It is no longer necessary to darken rooms completely to secure the best results from projectors. Where this is necessary there is often a loss in instructional value which should be taken into account in considering the acquisition of this type of apparatus.

Subject matter which is trivial in character and lacking in real content takes on little if any added value simply because it is embodied in visual form, as in picture, slide, or movie. This and other practical considerations applicable to the acquisition of visual equipment rest largely for their solution upon the teacher working in the classroom.

SOME TRENDS IN SCHOOL-BUILDING PLANNING AND CONSTRUCTION

DAVID H. PIERCE

EDITOR'S NOTE: Dr. Pierce is in the department of school administration at New York University. Since leaving public-school work he has centered his attention on school architecture and building surveys. The present article summarizes recent practices in building planning.

F. E. L.

Cities in general practice the plan of providing school funds from current taxes to pay the educational bill. One year and the next money is set aside in fairly comparable annual amounts to pay this educational bill. It amounts in principle to a split of the municipal dollar by some budgetary procedure. No such plan can be claimed generally in capital outlay. Buildings are frequently erected under pressure of over-crowding and possibly after repeated failure of a building-bond program. The rest is highly problematic in too many cities as to the provision for buildings at the time when they are needed, but once the funds are available plans shape themselves rapidly. They are frequently not too well considered as to selection of architect and determination of educational requirements, such as location, room size, lighting. It is a hurry-up job. The building is needed and any type of building is acceptable. There is, however, a strong tendency to improve the condition under which housing for children is effected.

Preliminary Planning: The preliminary considerations in school-building plans have reached the point where it is now being widely propounded and accepted that any architect is not a school architect. There seems also a willingness by boards of education to regard the superintendent of schools as an important liaison officer in the relationship of the board to the architect and the contractor.

State departments of education are tend-

ing more towards requiring approval on tentative plans and blueprints of buildings before construction begins. It is possible that the standardization required by State departments can be over emphasized to the neglect of local needs and ability to provide. There is in some of the newest buildings a layout of offices for the board of education and also offices of the superintendent of schools, both in a high-school building. This is a doubtful location, considering the responsibility of the principal for his building. As to the rooms for the board of education it would seem that the superintendent's quarters were adequate for its needs. Such a step in economy seems now to be overlooked.

Type: A colonial type of architecture is making progress, notably in New Jersey. This type is marked by having two floors, a façade with columns supporting a tower. It frequently has bilaterally symmetrical wings, also low elevation of the first floor which requires only limited excavation.

In the old structures there was a fondness for the ornate. There were high ceilings, elaborate parapets, windows of many shapes and sizes, imposing columns and over-heavy entrances. Now we regard these features as extreme. There is a tendency in present buildings to recognize the possibilities of housing the maximum number of room units within a structure in which the three dimensions tend to approach equality, thereby improving the cubiture. Modern buildings through an

attempt to improve the cubiture and standardization of features, have tended to take on the appearance of factories.

Perhaps the more recent tendency is to achieve aesthetic quality of the whole structure, such as the beauty of entrances achieved through simplicity and at the same time to observe an economy formerly lost in high ceilings, ornate decorations, elaborate basements, and large unused attics. There is, in short, a trend towards combining practical principles and beauty in construction.

Utilization: Early studies dealt with the degree of use of rooms within the school program. A later study revised this scheme of computation to determine how much the building was used within the school program in terms of individual seats or stations. A study now being made is attempting to accept the standard walls of the classroom as the outside limitations of an area, from which must be deducted aisle space and room for furniture; the remaining area to be used for seating. This applies to both fixed and movable furniture. It deals with classrooms principally. Great rooms of the building are expensive, which considering their use, can scarcely be wholly justified. The social pressure on school costs may lead us to inquire whether a gymnasium, for instance, which is the equivalent of say twelve classroom units can be maintained for the minimum purpose it now serves.

Basement and Excavation: Basements which have for their chief purpose housing the heating plant with its accessories and providing some limited storage space, can not justifiably require the elaborate excavation that is still being made. It is perhaps a good sign that State laws are making it more difficult to use basement classrooms. Then it would appear the mechanical ventilating schemes which are

seriously questioned still require excavation and expenditure past actual needs. In other words, it is being found unnecessary to hoist the whole building into the air, thereby requiring an approach of many steps to reach the first story, merely to insert under the structure a basement of the traditional altitude.

There is a type of building coming into existence in suburban areas; there is developing the suburban school.¹ City workers who can afford to live in suburban towns are showing a tendency to construct excellent buildings, frequently for small enrollments.

Size of Building: The size of buildings has been stressed up to the present by some. They claim two essential points. One is that the instruction program committed to homogeneous grouping is possible only with large numbers of students. The second is that the equipment of the major features of heating, ventilating, and the sort requires a large building in the interest of economy. The enrollment figure has been arbitrarily placed at fifteen hundred.

Both these arguments for the large building are not wholly sound. There seems some justification in centralization of facilities within buildings to increase the kinds of rooms and equipment made possible by centralization.² Homogeneous grouping has come to be seriously questioned. There is definite recession from the enthusiasm of "XYZ" grouping. It might be remarked that homogeneous grouping on one factor makes heterogeneous grouping on most other factors. There is another item relating to grade organization. Within the last ten years there has been a distinct passing from the "8-4" to the "6-3-3." This means that while our

¹ James O. Betelle, "The Unusual School System of Suburban School Community," *The American School and University*, 1928-29, page 81.

² William B. Ittner, "Robert A. Long Complete School," *The American School and University*, 1928-29, page 69.

enrollment has greatly increased, we are scattering twelve grades to three institutions rather than to two of the old division. Moreover this change affects the lower grades more than the higher ones, and it is here that the greatest relief does come from numbers. Obviously with the same enrollment we could have smaller schools on a "6-3-3" plan than on a "8-4" plan. There seems a distinct tendency to hold to the large school idea in spite of the fact that there are strong arguments against it.

Size of Classrooms: The variety in size of recitation rooms was once conceived as resulting from accommodating the size of the room to the exterior features of the building as conceived by the architect. There is still a tendency to believe in economies such as having small rooms for small classes, but clearly cost alone decries the use of small classes. These are especially peculiar to the high school and "staggering" classes, such as Latin three one year and Latin four the next, can relieve much of the load. Also, generally speaking, very small classes cannot always be justified on educational grounds. It seems more plausible that classrooms of constant size be constructed to accommodate this specification. It is not necessary to make every classroom a permanent one. Dividing walls built of temporary blocks serve the purpose for classrooms, and at the same time permit removal to make larger or smaller units as necessity dictates.

Play Facilities: Play facilities are being thought of now in terms of acreage rather than square feet. The small cinder-surfaced lot and distant athletic field still persist, but better interpretations for play space under the requirements of a health program for individual pupils are making good headway. While the greatest need for play areas is in the territory where it is most difficult to secure and where

closed streets and roofs are being resorted to, it is also true that in areas where land is cheap play spaces are too frequently not provided. In midwestern cities and elsewhere there is a tendency to provide municipal facilities for play and these offerings supplement those of the board of education.

Vertical Travel: Vertical travel is gaining recognition. There has lately been built a five-story junior high school which has no elevators. This is an extreme case of error on the educational side. There is a hopeful tendency towards buildings of fewer stories. The mission-type school of the Southwest may not ever become generally popular, but the two-story building is being shown preference. Passenger elevators are appearing, and ramps are in some places taking the place of steps. These conveniences of vertical travel are tardy considerations for the health of adolescent pupils.

Dimensions of Instruction Rooms: In dimensions of recitation rooms the width is quite generally accepted as twenty-two feet. The height of rooms at twelve feet seems as nearly constant, though an economy attempted in one city and based on a lesser height leaves the ceiling structure exposed or with the cement forms remaining placed. As to the length of the room there is not general agreement, even though the "cloak room" is included. The dimensions of great rooms and laboratories are not at all constant, varying almost as does the number of situations.

Color Scheme: Color scheme of classrooms seems hit and miss. One sees classrooms decorated in dark brown, sage green, and clear blue. The general practice of home lighting by use of soft yellows and oranges both in artificial lighting and in pigment decorations seems generally popular.

There is not apparent a parallel of this practice in determining wall and ceiling coloration for classrooms. It seems apparent that children are more sensitive to color than adults, and that colors vary in producing effects as to complacency. While ivory, cream, and buff seem to be more generally used than the other colors, that is only a tendency. Since an important percentage of the classroom walls are frequently covered with slate blackboards, which absorb about half the light that strikes them, and since there has been found that about fifteen running feet is all that is used in the typical classroom, it would appear that the wall color scheme and the amount of blackboard need study. In any case, there is in progress a study to determine scientifically the emotional effects of the color scheme.

Fenestration: Fenestration now centers around practice of narrow mullions, a dead end at the front of the room and windows extending to the ceiling, with common use of 2A glass in stock sizes. There have been reliable experiments in the value of glass of an improved type which admits the ultra-violet rays. Since its price is approaching a level to permit use, ultra-violet glass may be utilized to a greater extent.

Desks: Furniture principally relates to classroom desks. Fixed desks have tended to give way to movable furniture. While the early types were heavy, awkward, difficult to move, easily tipped over they were not generally preferred by teachers, though they had the advantage of portability. In place of one-unit movable furniture, tables and chairs are coming into rapid use. Aside from advantages in the learning process they have the advantage of being cheaper, easier to move, better suited to janitorial care of the room, more easily adjustable to pupil size, and have more satisfactory storage space.

Toilet Placement: Toilets and washrooms were previously placed in the dark, moist, unsanitary sections of the building. It is now clearly a tendency to recognize the value of sunlight in placement of toilets.

Ventilation: Ventilation is undergoing change generally. This is due to the new recommendations for window ventilation with gravity exhaust. Such a change is welcome because of greater economy, simplicity of construction, and ease of administration. There is one important building erected a few years ago which has never operated its ventilating equipment and declares that it achieves adequate ventilation without the mechanical means.

Heating: Heating of the future will likely be considered with regard to the possibilities of several fuels, such as hard or soft coal, crude petroleums, and natural gas. All these are now being successfully used in given localities. There is a possibility of our using centralized heating service and also auxiliary electric heating. Probably hot-water heating as now handled cannot be made to give rapid rise and fall of temperature required in the school heating plants.

Maintenance: Janitorial service has been improved by employing full-time janitors and engineers with the authority of custodians. Training classes for janitors have probably resulted in net gain. The janitorial personnel has been hampered by the high turnover of trainees, oversupervision, and low salaries. Chicago has located an economy in building maintenance by discontinuing its staff of reserve janitors. The complexity of building that requires skilled knowledge and longer tenure is usually maintained.

Practical Arts: In the practical arts a limited change is taking place. There is a tendency to adopt nonspecialty shops or laboratories. Cities have been making

choices in organization as between two possibilities. One is to centralize practical arts in one building. The other is to segregate them in separate schools, especially on the high-school level. According to Budge, boys of sixteen, seventeen, and eighteen carry one to many jobs in the first six months to a year of their employment. It is not held that the school can hope to give vocational training for the jobs held by most boys of the late teens. It can be hoped, however, that general cultural values can come from the handling of tools and materials. The general shops that are now instituted apparently aim to provide general cultural rather than purely vocational values.

Broadcasting Within the Building: Radio has already taken a place in the school. Some principals are now using it for administrative broadcast within the building. A future can scarcely be predicted, but installation before buildings are constructed should be cheaper and this, I think, should be considered.

Depreciation: Depreciation of buildings has not been well analyzed. There seems little or no tendency to view additions and maintenance in the light of some law of diminishing returns. It is commonest, perhaps, to forget that the building will ever be unserviceable. It is unsound to propose that it will last seventy-five or even fifty years. "Straight-line depreciation" is an arbitrary way of figuring, but better than not to figure at all. It is likely that the change of use of building will in the future be as great or even greater than it has been in the past. It is perhaps unsound to compute building cost on the life of a building basing computation on fifty to seventy-five years, much as it is unsound to float bond issues for long periods of time.

Bond Financing: Bond issues for buildings are now being floated on a short-time

serial basis and correspondingly sinking-fund financing tends to disappear. Hindering factors in employing short-time serial practice and in getting away from sinking-fund financing are due in part to restrictive legislative, charter, or municipal enactments which require the older methods. Also, cities having outstanding bonding indebtedness, chiefly for buildings, find themselves embarrassed in retiring the old long-time bonds and short-time bonds at coinciding maturity dates.

Standards: Standards may improve educational service, also they may hinder it. The literature possesses a strong tendency towards the use of specifications. There is some overstandardization. For instance, clerks of boards of education and business officers have gradually extended their powers in some centers so that they have mechanized procedure which would better be fluid. Janitorial service has perhaps reached the point in two or three cities where it is difficult to secure immediately pressing service in the care of the building. As to erection of the building itself standardization has probably not been overdone though possibly emphasis has been misplaced.

Use of the Whole Plant: Wider use of the school plant can be much more extensive than we now find it. While the United States among civilized nations has a high average number of years of school per pupil, the amount of time per year per pupil is relatively short. Public schools now operate on the equivalent of every other day of the calendar year and the school plant is consistently idle important hours during every day. The future may require, in view of the pressure on the financial side, consideration of the use of the plant late afternoons, evenings, Saturdays, and vacation time.

PRACTICAL ART-SHOP EQUIPMENT

THOMAS P. KELLY

EDITOR'S NOTE: Mr. Thomas P. Kelly is principal of the Benjamin Franklin Junior High School, Yonkers, New York. Mr. Kelly has had experience as a teacher as well as an administrator and guides the work of his vocational departments exceedingly well. The practical-arts laboratories in the Benjamin Franklin School are especially well equipped for those types of work for which they are designed.

H. H. V. C.

The choice of shop practices and the type of equipment for a junior high school should conform to the requirements of the community in which the school is located. A survey of the occupational demands and the economic and social conditions will determine the character of the school and incidentally limit the variety and number of practical-arts courses.

The Benjamin Franklin Junior High School is located in the center of the industrial section in the City of Yonkers, New York. The school population is drawn largely from the homes of people who were not born in this country, and whose means of livelihood is secured through employment in the Smith Carpet Factory, Otis Elevator Works, National and Federal Sugar Refineries, and several other similar industrial organizations.

A fairly accurate estimate of occupational needs and educational distributions may be derived from the following:

Number completing grade eight, June, 1929..	600
Number entering grade nine academic.....	150
Number entering grade nine commercial.....	250
Number entering grade nine technical or trade	125
Number leaving school (working papers)....	75

At least 50 per cent of the number of these children should be properly guided through the channels of practical-arts courses into the everyday world.

Classes are organized on the basis of eighteen boys and eighteen girls. For administrative purposes, it facilitates the use of gymnasium, mechanical drawing, household arts, and shop practice. All seventh-

grade girls must take the course in cookery. During the eighth year they rotate between clothing and homemaking, spending one term in each of these activities. The seventh-grade boys are placed in the general shop, where they remain during the entire year. The next year they rotate among the print, electrical, and sheetmetal shops, spending about a third of the year in each. Thus every child has had an opportunity to explore the several shops.

A short summary of the courses and a list of the equipment is listed below.

GIRLS' DEPARTMENT

Home Management: "The purpose of general home economics is to help secure and maintain the best type of home and of family life as vital forces in American society. The best type of home is a place in which children may be protected, nurtured, and developed into men and women, sound in body, trained in mind, disciplined in character, and prepared to assume their rightful duties and responsibilities in a working field. A satisfactory home, moreover, is a place in which the worker may secure rest, refreshment, and recreation."¹

A five-room foyer-hall model apartment, consisting of living room, dining room, bedroom, bathroom, and kitchen with butler's pantry, is completely furnished to carry on this work. The appointments in the apartment are superior to what the children now have at home. Below is listed the larger equipment.

¹ Commission for the Reorganization of Secondary Education.



THE NEW BUILDING FOR THE SCHOOL OF EDUCATION, NEW YORK UNIVERSITY



OPERETTA CAST,
AUDITORIUM
SHOWING COSTUMES
AND SCENERY
DESIGNED AND MADE
BY PUPILS IN
CENTRAL PARK
INTERMEDIATE
SCHOOL,
SCHENECTADY, N.Y.



SWIMMING POOL,
CENTRAL PARK
INTERMEDIATE
SCHOOL,
SCHENECTADY, N.Y.

D
a se
room
makin
vided
Laund
faciliti
given

De

Clo
pupil
are:

Kitchen

1 stove
Laundry tubs
Sink
Table and chairs
Refrigerator
Kitchen cabinet
Broom closet
Electric ironer
Vacuum cleaner

Dining Room

1 9 x 12 rug
1 9-piece mahogany suite

Bedroom

1 mahogany bed
1 mahogany chest of drawers
1 mahogany mirror
1 mahogany bedside table
1 mahogany chair
1 bed spring
1 felt mattress
1 pillow and bed linen

Living Room

1 table
1 bookcase
1 rocker
1 armchair
1 table lamp and shade
1 settee (tapestry)
1 chair
1 9 x 12 rug

Foyer Hall

1 4 x 6 rug
1 console and mirror
1 end table
1 Windsor chair

Butler's Pantry

Set china dishes
Cutlery
Glassware
Silver
Table linen

Domestic Science: This department has a separate kitchen and a demonstration room; the latter is also used by the home-making classes. A large, airy room is provided; the unit kitchen system is used. Laundry practice, because of lack of this facility in the building, must necessarily be given in the kitchen.

Domestic science 8-unit kitchen:

8 kitchen cabinets (Sellers)
8 kitchen stoves
1 demonstration table
5 Sellers tables
1 steam pressure cooker
1 ironing table
2 tubs
27 stools
2 broom closets
1 refrigerator
1 electric washer
1 electric mangle

Lecture Room

30 tablet arm chairs
1 filing cabinet

To study the sources of clothing material
To develop an appreciation of clothing in relation to health

To develop an appreciation of clothing and its care, including removal of stains; renewal of color, dyeing, mending, altering, and remodeling

To help girls to select clothing wisely from the point of view of suitability, durability, and economy

To enable them to make measurements and to apply same to simple garments

The equipment is located in a large combined sewing and cutting room with an adjacent dyeing room:

13 motor (detachable) sewing machines
13 benches
8 sewing tables (battleship linoleum tops)
20 chairs
2 full-length mirrors
150 individual wall lockers
Dyeing room: Laundry
Stove
Sink
Welch cabinet

BOYS' DEPARTMENT

General Shop: This shop is exceptionally well fitted for the part it takes in ex-

Clothing: A few of the objectives for pupils in the clothing course for one term are:

ploring the boys' aptitudes and in training them to appreciate the value of hand and machine products in the industrial world. The shop, 71 by 31 feet, is divided into two major parts; namely, woodworking and metal working. It has three adjacent rooms: a forge room, foundry, and painting room. The general scheme and objectives of this shop and the electrical and sheetmetal shops to be described are somewhat similar.

It is a try-out shop. Boys are admitted to woodworking, simple manual training, and gradually advanced to the use of woodworking machinery practice. Later the boy is given experience in bench and vise work; then he is advanced to the metal machines, the lathe, shaper, drill press, and saw. This is not a trade school. The equipment, therefore, is to be evaluated with that thought in mind.

- 1 engine lathe (large)
- 1 engine lathe (small)
- 1 speed lathe
- 1 wood-turning lathe
- 1 band-saw machine
- 1 circular-saw machine
- 1 jointer
- 1 drill press
- 1 sensitive drill
- 1 universal shaper
- 1 tool grinder
- 1 power hack saw
- 1 arbor press
- 1 gas furnace
- 1 electric furnace
- 1 double forge
- 6 woodworking benches
- 7 machine-vise benches

Sheet Metal: The purpose of this course is to give a working knowledge of the sheet-metal tools and machines. It is an exploratory course. The equipment is as follows:

- 10 benches with gas furnaces
- 2 stake benches
- 1 machine bench
- 1 Pexto revolving machine
- 1 beading machine

- 2 burring machines
- 2 bar folding machines
- 1 seamer machine
- 1 setting machine
- 1 wiring machine

This is an eighth-grade experience. After the boy has had one year in the general shop, he is given opportunities in sheet-metal, electrical, and print shops before he has completed the eighth grade.

Electrical Shop: The purpose of the electrical course is to develop an understanding of magnetism and electricity and to be able to apply such knowledge to simple everyday apparatus. All boys love to tinker, to build, and to create something, especially if it will move or operate. This is a wonderful opportunity for the development of "hobbies."

The supplies, of course, are far greater than the equipment.

- 16 benches
- 1 large wall board
- 16 individual bench boards
- 1 cabinet
- 1 locker for work
- 1 wire tool cage

Print Shop: Of all the practical-arts subjects adapted to the junior high school, there is not one that offers the same general educational possibilities that the art of printing does. In spite of all the demand for special printing favors for the school, and for other schools in the city, the print shop in the Benjamin Franklin School does not neglect its course of study, and does not lose sight of its objectives.

The journalism club, sponsored by the printing department is divided into several activities: printing, contributing, reporting, sketch and art, photography, short-story writing. These combined units prepare and publish the monthly paper.

This print shop does not compete in any way with outside commercial shops, its ac-

tivities being largely confined to material that probably would not be printed if the opportunity for doing so were not available.

The equipment is modern:

- 1 Potter cylinder proof press
- 1 Colts armory model 5
- 1 new series Chandler and Price press

- 1 (Style B) Kelly automatic press
- 1 Diamond power paper-cutting machine
- 1 wire-stitching machine
- 1 perforator and punching machine
- 6 double-steel cabinets and type stands
- 1 wall paper shelving
- 1 wire tool crib
- 1 proof-reading table

THE GREAT ROOMS—AUDITORIUM, GYMNASIUM, POOL, AND CAFETERIA

MERTON R. PORTER

EDITOR'S NOTE: Mr. Merton R. Porter is principal of the Central Park Intermediate School, Schenectady, New York, and also the director of the Schenectady Evening School. He has had experience in the public schools in New York State as teacher, principal, and superintendent for many years. His school is one of the new intermediate schools erected recently in Schenectady and is equipped with auditorium, cafeteria, gymnasium, and swimming-pool facilities. Not only are the pupils of the school served by these facilities but the patrons of the school are also.

H. H. V. C.

There is no phase of our entire educational scheme in which more real progress has been made, in the last quarter century, than in public-school building construction. The small ward buildings with their cramped surroundings, dingy rooms, and narrow corridors, are rapidly disappearing. In their stead, we find a much larger sectional building with its playground adjoining and with its room arrangement carefully thought out. One-room country schools are gradually being replaced by the larger centralized village schools. Communities of all types seem to be awake to the needs of modern housing for school children.

To be sure, the increase in school population in the larger centers has made it necessary to build new buildings, but there is evidence of a widespread desire, in many places a public demand, that old school buildings be remodeled or new ones constructed in order to bring the adaptability of the school plant to a new and decidedly higher level. The advent of the junior high school has fostered this movement, because from the beginning the junior-high-school

promoters have fully recognized the civic, social, and health aspect of public-school education. This has been "sold" to the public, until practically all new buildings provide facilities for enlarging the scope of the child's training in this direction.

What special rooms should be provided in the building to properly carry out this civic, social, and health education? A rather wide range in answers would result, were this question submitted to educators in general. All would agree, however, that the four great rooms, auditorium, gymnasium, pool, and cafeteria, each serving its definite purpose, should be included, if possible.

THE AUDITORIUM

Of the four rooms, doubtless the auditorium had the earliest origin. In ancient times, meeting places wholly or partially enclosed, found favor. In the old academies scattered about the East, provision was usually made for a place where the students could be called together. Oftentimes, doors slid back into partitions, thus opening two or more rooms into one. When our pres-

ent public high school replaced the academy, the need for an auditorium became still more apparent and since the junior high school came, the auditorium has been as much a part of the regular construction as has the classroom. It has practically become standardized. It is not a question, then, whether there should be an auditorium or not; the question arises over the use made of it.

The first use of the auditorium is for assembly purposes. This is, perhaps, its greatest use. It is here that the auditorium becomes the living room for the school family. All gather here, the faculty and pupils, to enjoy an hour together. Problems relating to the school family, only, are discussed in a manner so that each feels he is a part of the institution. In other words, a school morale is established here, school spirit aroused, and school loyalty fostered.

Here, the opportunity presents itself for bringing speakers, musicians, or artists along any line, who are able to inspire a group of boys and girls. Bureaus are already being formed to furnish talent for school assemblies, the same as lyceum bureaus have done for lecture courses, entertainments, etc. There seems to be a growing demand to enlarge upon this particular use of the auditorium.

Then there is the school play or operetta which is handled as a school project, centering, of course, upon the stage in the auditorium. The music department selects the operetta and the singing voices; drills the choruses and is, in the main, held responsible for the success of the undertaking. The English department, however, steps in to take charge of the speaking parts, the art department designs costumes and scenery, the class in electricity supervises lighting, the boys in the woodworking classes erect the scenery, the girls in the homemaking department make the costumes, the printing department takes care of the programs

and tickets, and the commercial department handles the finances. Thus, from this one room, as a center, a project may be made to radiate and come directly in touch with practically all departments of the school.

Then there is the commercial value of the auditorium to the school. The student council puts on an entertainment for the benefit of the school paper. The library club observes Book Week and raises money for library books or magazines. Homeroom No. 210 gives a moving picture during noon hour, the proceeds of which go to buy a fine picture for their homeroom. Special programs for special days rather than regular assembly periods can be enjoyed by the entire student body. Many auditoriums are used for student groups under student supervision such as committee meetings, meetings of the executive staffs of the various classes, and even subject-project meetings.

The auditorium has value from a pedagogical standpoint. Many times during the semester it is necessary to assemble a large class of pupils for the purpose of group teaching. Time is saved by this method when we teach some phases of social science or discuss problems arising in the guidance department such as occupations, courses of study, and entrance requirements to higher institutions.

It is the one room in which the public feels the most at home. Parents who hesitate about appearing in the classroom are loyal supporters of auditorium activities. Its use reaches out to the public and affords an opportunity for lectures, concerts, and entertainments of an educational nature not necessarily connected with the school. This is always desirable in any community.

GYMNASIUM

The gymnasium is the playroom in the school plant. It affords a place for recrea-

tion at times when the playground cannot be used. This statement is made advisedly because the gymnasium should not take the place of the playground. In other words, a rollicking game in the open air and sunshine is always preferable as a health builder to exercises in a closed gymnasium. This belief was not prevalent even in quite recent times, but is coming to be more and more recognized.

The gymnasium, of all the rooms, should be bright and airy. Too many of them are built in the basements below ground level with windows near the ceiling and with little or no opportunity for complete ventilation from outside.

Of course, the gymnasium will never be supplanted by the playground because on stormy days and in cold weather, there is an imperative need for a place indoors to carry out the health program. The mistake is often made of building the gymnasium too small. It should be of sufficient size to permit a false partition dividing the room into two parts, one for the boys and one for the girls. Each part should be large enough for a basketball or volley-ball court. Then when the two are thrown together there is space not only for the regulation courts, but for spectators as well.

The gymnasium serves a definite purpose for the social activities of the school. Here it is that the dance club meets, the boy scouts and the girl scouts hold their meetings, and various intramural contests are conducted.

THE POOL

The swimming pool is one of the newer additions to the public-school equipment. In many instances, it is considered too expensive to install and maintain. For this reason, it is often eliminated after plans have been made to include it in a building.

The pool, when rightly used, is not an extravagant feature. The value of learning

to swim cannot be measured in dollars and cents and every boy and girl who is physically fit, should, as part of his general education, be taught to swim. Some colleges are requiring this before a diploma is awarded. High schools and possibly junior high schools might make this mandatory for graduation.

Most public-school pools are opened at least five evenings a week to adults. The local Red Cross is often granted the use of the school pools for its winter activity. The writer believes that so much importance from both physical and educational standpoints is attached to the swimming pool that in a few years, no building will be considered complete without it.

CAFETERIA

Our cafeteria has come into our public-school system as an answer to two needs:

(1) That children be taught what constitutes a balanced lunch

(2) As a time saver

A great deal of attention should be given to the midday lunch of a growing boy or girl. Oftentimes, what is eaten is not suitable or if a suitable lunch is prepared, pupils eat it too rapidly when left unsupervised during the noon hour. School buildings that are provided with cafeteria room sufficient to feed the entire student body in no more than two shifts can take care of the quality of the lunch and the care with which it is eaten by the pupils. In such cases, the school program usually provides for two lunch hours, with one-half hour each. The first division goes to the cafeteria at 12 o'clock while the other division is studying. Then for the next half hour, the program is reversed.

Following is a typical menu for a junior-high-school cafeteria:

Sandwiches—ham, lettuce, cheese, and olive..	\$.05
Special all 3 for .....	.15
Roast pork with dressing and brown gravy .....	.10

Mashed potatoes .....	.05	The cafeteria makes it possible to reduce
Buttered green beans .....	.05	the usual noon hour from sixty or more
Soup—Vegetable .....	.05	minutes to thirty minutes as outlined above.
Salad—Pineapple or fresh tomato.....	.05	This is an extremely important saving of
Dessert—Homemade chocolate cake, lemon		time. It means that the pupils may be dis-
cocoanut pudding .....	.07	missed a half hour earlier in the afternoon.
Ice cream .....	.05	With the long junior-high-school day, this
Beverages—milk, chocolate milk, lemonade,		half hour in the open air is very valuable
or hot chocolate with whipped cream..	.05	to the adolescent boy and girl.

A JUNIOR-HIGH-SCHOOL MUSIC UNIT

HARRY W. LANGWORTHY

EDITOR'S NOTE: Mr. Langworthy is superintendent of schools in Gloversville, New York. He and his board of education consider music as a "way of life" and they have given much attention to their program of music teaching. Their new Estee Junior High School contains many interesting features, among which is the music unit which Mr. Langworthy describes in this article. F. E. L.

Experience in Gloversville had revealed that the community would get just as enthusiastic about an outstanding high-school band as they would about a championship football team. A first-class school orchestra seemed to arouse as much interest as a good basketball team. The enthusiasm of the student body for an exceptional trumpet soloist or an unusual violinist seemed just as keen as that displayed towards the pitcher on the baseball team. Such a public and pupil attitude towards music had made it possible to develop an extensive program of vocal and instrumental music in a community of less than average wealth. This was possible despite the fact that neither the racial elements nor the previous education of parents or pupils furnished a particularly strong musical background for such work.

The usual program of vocal music in grades and high school had been carried on successfully for many years until about six years ago there came a demand for a more extensive program. The schools were already overcrowded; yet, despite the fact that no space was available for the develop-

ment of an adequate music program, considerable progress was made. In cramped quarters in an old tenement block, in school basements, and in rented quarters on the third floor of business blocks the following program was developed:

Grade Schools—Kindergarten to 6th Grade

- 1 grade-school orchestra
- 1 all-city grade-school orchestra

Estee School—Grades 7 and 8

- 1 band
- 1 orchestra
- 1 drum corps
- 1 glee club

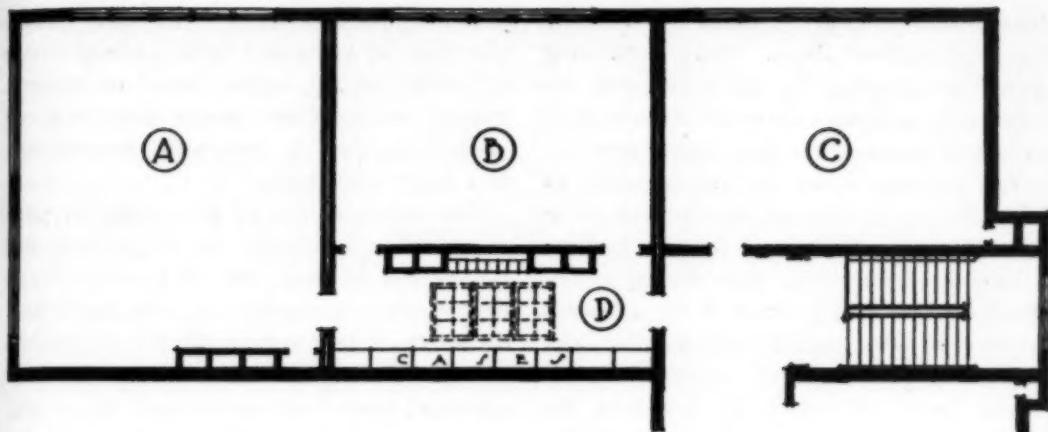
High School

- 4 theory classes
- 2 glee clubs
- 1 choir
- 1 band
- 2 orchestras

General

Group instrumental instruction for 550 pupils

When plans were drawn for a new junior high school a music unit naturally played an important part in the thought



MUSIC UNIT ESTEE JUNIOR HIGH SCHOOL-GLOVERSVILLE, NEW YORK.

W. BROWN VAN DRESEN, ARCHITECT

(A) INSTRUMENTAL ROOM

(B) VOCAL ROOM

(C) CLASS ROOM

(D) INSTRUMENT ROOM

of parents, pupils, and school officials. Such a unit must provide for an extensive music program for both junior and senior high school. Vocal music required provision for 1000 pupils in regular classes, three glee clubs, and a choir. On the instrumental side provision must be made for two bands, three orchestras, and a drum corps. Group instruction in piano, voice, string, wood-wind, brass, and percussion instruments for 550 pupils must be taken care of. In meeting the needs of these groups two major problems were presented:

(1) How can the music program be carried on without disturbing other groups in adjoining rooms?

(2) How can large groups be handled in small rooms without being hampered by the excessive reverberation?

In many schools the problem of disturbance is met by employing a high degree of soundproofing in the construction of the music unit. Since this involved high construction costs, the problem of disturbance was met in the Gloversville school by a

high degree of isolation, together with partial soundproofing. The final plans as carried out provided the following rooms, as shown in the accompanying floor plan.

(A) Band and orchestra room, 30 by 35 by 13 feet.

(B) Vocal music room, 22 by 31 by 13 feet.

(C) Classroom for future use of department, 22 by 33 by 11 feet.

(D) Instrument room, 11 by 30 by 11 feet.

The location of these rooms in the building is the most important factor in avoiding disturbance of other work. The music unit is on the top floor. The south and west walls are outside walls. The east side is a blank wall over the upper part of the gymnasium. Between the rooms are partitions made of two complete walls of 4-inch gypsum blocks separated by a 2-inch dead-air space. Two sets of special doors separate the music room from the corridors and stairways. Beneath the music room are located science laboratories, science workroom, and a corridor. It was thought the type of work carried on in the lower

rooms would not be seriously disturbed by music on the floor above. Heavy cork tiling as a floor covering for the music unit decreases the amount of sound communicated to rooms below. No heat ducts were allowed to pass from the music units to lower floors. It was not thought that these precautions would make it possible to have a band or drum corps play during school hours without being heard in the adjacent rooms, but it has been found that the large music organizations can perform during school hours without being heard in the major portion of the building. The adjacent rooms do not find the music objectionable.

The local program now makes it necessary for the larger instrumental units, bands, orchestras, and drum corps to meet outside of regular hours. This removes one of the largest factors of disturbance. However, the ensemble groups, group instrumental instruction, and glee-club activities can be carried on during school hours without pupils in adjoining rooms being conscious of their presence. The double thickness of wall makes it possible for an instrumental group to use room A and a vocal unit to use room B without disturbance to either group.

The ordinary classroom with its hard, smooth plaster, and its hardwood floor makes a sounding box very difficult for the use of large musical groups. To overcome such reverberation acoustical plaster was used on walls and heavy cork tile used for floor covering. The presence of a hung ceiling made it possible to make the rooms A and B two feet higher than the usual classroom. Room A has a floor space about twice that of the ordinary classroom, while room B is only slightly larger than the standard

junior-high-school classroom. The special treatment of walls and floors enables musical units of 60, either vocal or instrumental, to use these rooms with less reverberation than is frequently encountered in a large auditorium.

The vestibule (room D) serves in part as an aid in insulating the room from the rest of the building, but its primary function is as a storage room for band and orchestra instruments. All school instrumental instructors know the large amount of time wasted in assembling the usual band or orchestra. The pupils come in, take out and set up their music racks. Then they take their music from the case. Next they take out their instruments. And last, and worst of all, they tune their various instruments. This procedure usually takes about ten minutes. Nearly all of this is eliminated in the Gloversville unit. Music stands are in position and music in place before the orchestra arrives. As pupils enter the music unit they step to the instrument case, secure their own instruments, strike the tuning bar in the vestibule, tune the instruments, pass into the band or orchestra room, and are at once ready for an enjoyable music period.

It is not thought that the music suite of the Estee Junior High School is perfect. The description here given merely shows how one community solved the problem presented by an extensive music program and a limited community income. The unit is completed and is functioning as well as was expected. One important omission has occurred. The school has not provided satisfactory space for individual pupils to take private lessons during school hours. This will be the next step in the Gloversville music program.

SCIENCE LABORATORY EQUIPMENT FOR JUNIOR AND SENIOR HIGH SCHOOLS

ARTHUR SEUBERT

EDITOR'S NOTE: Mr. Arthur Seubert is a representative of the Keweenaw Manufacturing Company. He was formerly an instructor in engineering at Washington University, St. Louis, Missouri, Brooklyn Polytechnic Institute, and Cooper Union, New York.

D. I. M.

The selection of science laboratory equipment is usually influenced by all of these factors: (a) the size of the school; (b) the courses to be given and methods of instruction; (c) the number of classes and sections that must use the laboratory; (d) the room available; (e) the plumbing facilities that are existent or that can be provided; (f) the money available; (g) the board of education. From the large city high school to the one laboratory village school, each usually presents a different problem.

With the present cost of school buildings and the adoption of the efficiency principle that each part of the physical plant be in constant use throughout the school day, has come an increasing demand for flexible equipment that is adapted for various uses. The large city junior or senior high school with sufficient classes in each subject to warrant specialized laboratories presents a comparatively simple problem. Likewise the small village high school of about seventy-five students can be readily equipped at a moderate cost and along fairly uniform ideas. But the great number of large village schools and small city high schools with unbalanced science registration in junior and senior departments often presents real problems in order to provide adequate equipment within reasonable cost and space to carry on the work required.

Even at this date, school boards all too frequently fail to realize that laboratory plumbing facilities are a part of the building itself, and that often the room assigned for laboratory purposes is not adequate for

the requirements. Fortunately, school architects in general have realized the condition and force action by the board before too late.

Where laboratories formerly were used solely for experimentation, today they must also serve for recitations and frequently for home rooms. And with the trend towards abolition of fixed laboratory periods, the instructor using any period for experimentation to keep step with recitations, the equipment must be such as to allow for the change with least confusion and loss of time. The laboratory now is the center for all work in that science—recitation, experimentation, and reference reading. With new developments in methods of teaching come new developments in design and arrangement of equipment.

Where no separate lecture room is maintained (their use is fast disappearing) every laboratory should have a good demonstration desk, preferably 8 feet long, equipped with water, gas, and electricity. Demonstrations are an essential part of science teaching, and poor facilities discourage demonstrations.

In each laboratory good lantern facilities should be provided, preferably for both opaque and slide projection. The alert science teacher, short on lantern slides, will find a mass of material in texts and scientific journals to help put across visually what is often most difficult by description. In the biology and general-science laboratories, many teachers have found adequate museum cases a great help. Some remark-

ably fine collections have been made by students whose interest was aroused by the teacher and who took pride in seeing the fruits of their labors exhibited for the edification and instruction of others.

Only bare outlines of essentials can of course be presented in the limited scope of this article. Those contemplating the equipment of new laboratories should discuss details with their State supervisors. Valuable data will be found in Bulletin No. 22, Department of the Interior, Bureau of Education, Washington, D. C. (published 1927), entitled "Laboratory Layouts for the High School Sciences" by A. C. Monahan.

THE BIOLOGY LABORATORY

For biology the preference still lies with the single-sided two-student table, 5 feet long, with black acid-resistant finished top. Three such tables placed end to end will fit nicely into present standard 22-foot rooms and allow good aisles at the sides. With the instructor's demonstration desk, fully equipped with water, gas and electric service, located in the front, the arrangement serves as a recitation room as well as a laboratory. Allowing a minimum aisle of 30 inches between rows of tables, a room 35 feet long will serve a class of 30 students comfortably.

A table or wall shelf along the window side is a very necessary part of the laboratory. It serves splendidly for plant boxes, small aquaria, microscope and special set-ups, and since radiators are also generally placed along this wall, a stone top will be found more satisfactory than wood to withstand the conditions imposed.

At the rear or side of the room a good laboratory wall sink should be placed for student use. And about 15 feet of storage and museum cases should be provided for apparatus, models, and the mass of museum specimens that interested students will

gather for the successful biology teacher. The illustration facing page 241 shows a well-arranged biology laboratory in the State Normal School, Cortland, New York.

As to aquaria, one good-sized fixed tank with water and drain connections is generally desired. But it should be supplemented with smaller portable aquaria, for not all aquatic animals live harmoniously together, and many teachers are often nonplussed at the sudden demise of pet specimens. Valuable help can be obtained from the State education department on the maintenance of aquaria. Some prefer the fixed aquarium on or near the demonstration desk, others near the window. While some sunlight is desirable, too much should also be avoided.

Lantern facilities should be provided. Other equipment is often added depending on the teacher and the extent to which the work is carried out. The above items are, however, essential.

THE GENERAL-SCIENCE LABORATORY

The same arrangement as given for the biology laboratory is very frequently used for general science with good results. Where the subject is presented as a lecture-demonstration course with no or very little experimentation by the students, this works very well. Where individual experiments are performed all or half of the tables should be equipped with gas and perhaps several well-placed electric receptacles.

Another arrangement, borrowed from the combination laboratory idea, is often used where general science is given as an experimental course. The eight-foot instructor's demonstration desk with its plumbing accessories is retained. Before it are grouped tablet armchairs, fixed or movable, to seat the class for recitation and lecture periods. Behind the tablet chairs, double-sided physics-type tables, $3\frac{1}{2}$ feet by 6 feet, are grouped four or six de-

pending on the size of the class. Aisles between tables should be 5 feet, certainly not less than $4\frac{1}{2}$ feet. Tables should be provided with gas outlets and preferably also electric receptacles. The laboratory wall sink for the students' use, storage and museum cases, window table or shelf, and aquaria should be added as in the biology laboratory. Usually for general science, only aquaria of portable type are used. Lantern facilities are essential.

Where the laboratory becomes the science center, a reading table with bookrack for reference books and periodicals is found very advantageous by many teachers. For such an arrangement a room 42 feet long is practically necessary for the laboratory.

THE COMBINATION LABORATORY

In all our village schools, and in many of the smaller city high schools, there is seldom more than one class in both chemistry and physics (or alternating each year) and one or two classes in biology or general science. One laboratory is therefore provided for all science work. In every combination laboratory a sacrifice must be made somewhere, for the same equipment must serve for all instead of specialized equipment for each science subject. Two very popular arrangements are in general use, to serve both for recitation and laboratory purposes.

In the Lincoln School of Teachers College, Columbia University, the Lincoln-type table has been developed and widely adopted. Each table is made up of T-shaped units, each unit for two students with one sink in common. For a class of 24, twelve units are required, generally placed in two rows lengthwise in the room. More or less units can be used depending on size of class desired, or units can be added as need arises. Tables are 33 inches high (a combination height) and re-

quire a special chair 3 inches higher than standard.

The eight-foot instructor's desk is placed at the head of the two rows, all students facing the instructor, and should be 40 inches high to bring all demonstrations in view of all students. For a class of 24 students and a demonstration desk, a room length of 35 feet is essential, not providing for storage cases. In the combination laboratory, a separate storeroom is desirable, providing cases in the laboratory itself only for museum specimens and the more expensive and delicate apparatus.

The second arrangement widely used is similar to that given above for general science. The demonstration desk and tablet chairs retain their respective positions, but in place of the plain tables in the rear of the room, combination desks are provided. These are usually $3\frac{1}{2}$ feet by 6 feet and 32 or 33 inches high equipped with a sink in the center, water, gas, and electric outlets, reagent bottle racks and drawers and cupboards below for the storage of students' apparatus. The adjoining storeroom is also preferable in this arrangement.

In any combination laboratory, window table or shelf, aquaria and lantern facilities are as essential as in biology or general-science laboratories. A fume hood may be added for general use, but unless positive draft by means of blower be provided, it is practically useless and had better be omitted, using the money to better advantage for apparatus.

THE CHEMISTRY LABORATORY

Purely chemistry laboratories are now practically restricted to large city high schools where there are enough classes adequately to make use of a comparatively expensive equipment. Many schools are using the Lincoln-type table to good advantage. It can be had with provisions for six sections, thereby making use of the room all

day for both recitation and experimentation and it allows of the utmost flexibility of schedule with a minimum of commotion. Also with fluctuating registrations in the subject, the room can, if necessary, be readily used for other purposes.

Of the various designs of chemistry desks, the twelve-foot length is most generally used, placed across the room. Aisles between desks should be 5 feet. If the desk has a trough running through the center, it may have one or two end sinks. Some prefer two center sinks placed in the desk itself at one-third length intervals instead of the trough, but this has the disadvantage of entirely hidden plumbing, and shortened drawers in front of the sinks. The trough type is the more popular design.

Fume hoods are a much mooted question; the trend still is towards one or two, provided with positive draft, but the old-time long banks of hoods are no longer used for high-school chemistry. Good room ventilation and omission of most of the "bad" experiments have eliminated the necessity of many hoods.

Where a separate lecture room is provided, a demonstration desk in the laboratory may be omitted; much depends on the instructor. But where one end of the laboratory is left free for tablet chairs for recitations, a demonstration desk fully equipped should be provided.

A storeroom adjoining the laboratory provided with shelves solves the apparatus storage problem very well, but at least one good closed case should be used for chemical storage to prevent excessive corrosion of chemical hardware and the "smoking" of glassware.

THE PHYSICS LABORATORY

The very precise nature of the subject itself should make the physics laboratory

a model for neatness and orderliness. Physics tables, usually $3\frac{1}{2}$ by 6 feet, are placed in rows of two across the room, with aisles of 5 feet between rows. Tables should be provided with gas and electric outlets. Any school that can boast a purely physics laboratory should provide a switchboard and motor-generator set to enable the class to keep step with the electric age. Many of our high-school boys pursue modern science hobbies that make the instructor step out to keep up with them. And facilities to help these boys will make the physics laboratory a most popular place.

A demonstration desk of generous size should be demanded by every physics teacher, where demonstrations or special experiments can be left undisturbed. And a window shelf the entire length of the room with gas and electric facilities is very important. At least one (two in a large laboratory) wall sink for students' use should be provided.

Good apparatus deserves good storage cases. Physics apparatus costs most, and therefore should have good care. A storeroom adjoining the laboratory, alas, all too frequently becomes a junk room. All instructors at some time or other are caught in a jam, the tendency then being hastily to remove the apparatus to a storeroom shelf, to be later put away. That frequently is the beginning of a bad habit. Good glass cases along the walls of the laboratory will ensure care and neatness by students and instructor. The first cost of cases will soon be saved by the longer life of the apparatus. Well-kept apparatus holds the respect of all; keep it outside in full view in good cases that are kept clean, so that students can see it and study it (not necessarily handle it) and not have it put out of their sight as soon as that particular experiment is performed.

THE ART ROOMS IN THE SECONDARY SCHOOL

ELIZABETH L. CUTTRISS

EDITOR'S NOTE: Miss E. L. Cuttriss has been head of the art department in the Cleveland Junior High School, Newark, New Jersey, for ten years. During this period many of her students have been very successful in winning various kinds of poster contests. Her article indicates the view she takes of the atmosphere of the art room.

D. I. M.

As atmosphere is necessary to life so is it a necessity to the aesthetic and creative life of the art room. Underlying this, however, is the physical side of the art room. In these days when the school has become a thing of beauty, every thought is being given to equipment; that of the special activity rooms in particular. This in turn must be judged not only from the standpoint of a good-looking room but from the working standpoint of pupil and teacher.

The most convenient size for an art room to serve a class of not more than thirty-five pupils, and preferably less, is what is known as a room and a half or approximately fifty-one feet long by thirty feet wide. To this should be added a working alcove, and a stockroom. In the alcove will be housed one or two electric plates of three burners, a sink with double end drain boards, a set tub for soaking raffia, reed, etc., a container for paper towels, a large refuse box with cover, a small scrap basket with solid sides, electric iron, pressing board, printing machine, type cabinet, working shelf or table, and a set of shelves for keeping paints, brushes, and other materials in use, including scouring powder. There is more pleasure and pride in keeping a porcelain sink clean than a soapstone sink, and oil-treated wooden drain boards are more quiet and can be just as easily cared for as porcelain ones. This alcove can be semi-enclosed; just enough to cover a direct view of pipes, scrap baskets, etc., but open to view enough for the teacher to keep an

eye upon those working at stove, sink, or printing press.

Balancing this alcove should be the stockroom, containing ample shelf room so constructed that large- and small-sized papers, and paper of different colors will have their individual compartments. Each color of paint should have its own cubby-hole. To quote Franklin, "Let all your things have their places." The stockroom should also house a paper-cutting machine as well as a smaller hand paper cutter. The outer wall of the stockroom should be large enough for blackboard space in a secondary-school art room.

One entire side of the room should be given over to wall display boards of cork linoleum tinted not more than two tones darker than the wall itself. Just under this should be a display shelf or if possible a series of glass-enclosed museum-like display cabinets. The space beneath this, converted into filing cabinets having doors opening forward and downward, is a help for the safe and orderly keeping of permanent exhibit charts of flat work.

The art room itself should contain at least one large built-in cabinet across an entire end. A very satisfactory type of cabinet has the top narrow section built with sliding glass doors. This makes a safe place for the many beautiful bits of pottery one finds in an art room. Here they add a color note to the room and may be enjoyed when not actually in use. From left to right, the cabinet is divided into three sections. The center smaller one is divided

into eight filing-cabinet drawers and two shelves for reference books. The end sections are divided into many shallow, sliding trays about fifteen inches wide. Assigning these trays to individual pupils makes for greater ease in checking work.

This arrangement of cabinets can best be used in combination with desks having built-in drawing-board space. When the drawing boards have to be housed elsewhere, a portion of the cabinet will have to be devoted to them as shown in illustration facing page 240 or space in the stock-room given to them.

The pupils' desks should be of a design suited for art purposes, each with one or more compartments in which to store utensils necessary for daily use. The particular style to be used is optional and matter for controversy. My preference is the individual table-like desk, having a portion of the top adjustable for working while the remainder is firm for the safe placing of paint jars, water cups, etc. One to six small drawers across the front, each having a lock and key, forms storage space for individual working materials, and at the side a door-enclosed compartment for drawing boards saves unnecessary moving about. A separate chair is used with this type of desk.

Another very satisfactory type of desk is that shown in the illustration facing page 240. Here two pupils work at a single desk but on opposite sides. The desk sides when raised become working tops to hold the drawing board. There are small individual drawers for the working materials and the drawing-board storage section is beneath the adjustable extension. The average art room will take eighteen of these desks and thirty-six high stools instead of chairs. One convenience in having this type of desk is that with the sides down they may be pushed together to make long tables at exhibit times. The movable chair and desk is to be desired in all art rooms but the desk

should be heavy enough to stay in place excepting when definitely and purposefully moved.

For pupils to draw, design, construct, paint, and model all in one room, it is necessary for each room to contain at least one large eight-foot table to be used for extra problems. More ideal planning is to have a small auxiliary room adjoining the art room where the pupils may go who are doing such problems as etching, modeling, linoleum block printing, etc. (See illustration facing page 240.)

The teacher's desk should be a rest spot reserved for her alone. If the cabinet room is limited there is a splendid teacher's desk on the market that is eight feet long by two and a half feet wide and contains ten large drawers.

A word regarding the finish of all the equipment—let a soft walnut brown replace the traditional golden oak. Wall backgrounds should be soft and neutral in tone. Plain and dull paint applied in fine spatter-work of several harmonizing colors over a plain undertone is very satisfactory and a relief from the plain walls of the classroom. This same method carried out in different tones of the underground color is also effective.

And now about lighting: an absolutely satisfactory type of artificial illumination from the standpoints of hygiene and beauty is still to be discovered. Of course the lights should be adjustable and in every other way carry out the fine points of modern hygiene of the eyes.

Modern psychologists are discovering the great power of suggestion upon human emotions; thus art should be taught in an atmosphere of beauty. With the foundation of equipment or the physical side of the room carefully planned for utility and beauty, the resourceful art director should be able to create by artistic incidentals an atmosphere that will make art live.

THE COMMERCIAL ROOMS AND THEIR EQUIPMENT

L. GILBERT DAKE

EDITOR'S NOTE: Mr. Dake is supervisor of commercial subjects in St. Louis. In addition to his experience as a teacher and supervisor of commercial subjects, he has had experience as a teacher of education. Mr. Dake's article is timely. The extensive building program of St. Louis has caused him to concentrate on the planning of efficient commercial rooms.

F. E. L.

The development of commercial work in the junior and senior high school has been so very rapid within the past few years that considerable attention is now being paid to the arrangement and equipment of rooms that will secure the best results. The ordinary classroom is not well adapted to most commercial classes because of the lack of flexibility in seating and the additional room needed to house necessary equipment. One superintendent made the remark that if he were to build another high school he would purchase his equipment first and then build his house around it. A careful study of the equipment needed for each commercial class is necessary, if the rooms are to be properly seated.

Commercial subjects requiring special equipment are usually the following: arithmetic, junior business training, book-keeping, commercial geography, typewriting, and shorthand. All other commercial subjects can usually be taught in the regular type of classroom.

An ordinary classroom is usually used for arithmetic and penmanship. It is more desirable to use a room equipped with tables instead of the regulation school desks. These tables should be eight feet long and twenty-six inches wide. They should be placed in two rows so that the student sits with his left side towards the windows. Each table should have three ink wells sunk flush with the top and spaced so that three students can use each table. Such a table could accommodate four students if necessary. It is very essential that one side

of the table be free from any underhanging supports so that the student can sit with both legs under the table. Light chairs should be used and they should be equipped with rubber buffers to keep down the noise. There should be sufficient room left between each table so that the teacher can easily supervise the work of an individual without disturbing those on either side. All available space on the walls should be equipped with a good slate blackboard.

The junior-business-training room should be equipped with the same type of tables as used in the arithmetic room. If this room is in a junior high school, the class in junior business training will probably function as a clearing house for various school enterprises, such as the handling of the school paper, a school bank, or the sale of school tickets. There should be a glassed-in room at the rear for such purposes. This room should be securely partitioned off from the main room with a desk along the side of the room facing the main room. There should be two or more windows through the partition through which business can be transacted. The space above the desk should be glass but the partition should run to the ceiling. As this office is in the rear of the room and is completely enclosed, with the exception of the small windows, it can be used by students while the main room is being used for a class exercise.

The junior-business room should have some special equipment. It is not necessary that there be enough of this equipment for

the entire class to use at one time but it should be varied enough so that each member of the class will get a first-hand acquaintance with simple office machines. This special equipment should include:

Adding machines—several of different kinds found in the offices of that city

Calculating machines—Comptometer, Burroughs, Monroe, Marchant

Ditto machine

Mimeograph

Cash register

Computing scale

In addition to these machines there should be filing equipment as follows:

Steel files—4-drawer, letter size, with space for a folder for each student

Model file with guides showing all types of filing

Individual instruction filing sets—one per pupil

There should also be available for the student in this course, either in the room or in the school library, as many books of reference as possible, such as the city directory, telephone directory, maps of the city, atlas, World Almanac, and Dun and Bradstreet's rating books.

It will be necessary for the teacher to have storage space for class materials and supplies. Built-in cabinet space is very practical for this use.

The commercial-geography room should also be equipped with tables to make it possible for the teacher to conduct some part of her work on the group plan. One side of this room should contain a series of glass cases for the collection of materials of commerce. Most large systems have an educational museum from which the teacher may draw exhibits for instructional purposes. Where no central museum exists it is well for the teacher to collect such exhibits as will best help to give her work vitality. This room should also be equipped with a lantern and the necessary curtain and shades for the windows. It is

preferable to have a lantern that will handle moving pictures as well as slides. It is now possible to secure very excellent educational films on a low rental basis and every commercial-geography teacher should make use of them. There should also be a good collection of maps, charts, an atlas, and a dictionary.

The tables in the bookkeeping room should be 30 by 72 inches with a 6 by 8 inch shelf above the table. There should be two pairs of ink wells in each table sunk flush with the top of the table and placed under the edge of the shelf. There should be not over three rows of tables in this room because of the light. It is well if sufficient artificial lights be furnished in each bookkeeping room so as to brighten up the tables during dark days. The inside wall of this room should contain cabinet space sufficient for individual storage of the papers and books of the student and for the necessary supplies for the teacher. There should be a storage space in this cabinet for each student of 4½ by 12 by 18 inches. These cabinets should be arranged in sections with filing space in each for thirty students. Each section of thirty shelves should have an individual door so that the teacher may keep the work of each class under lock while another class is at work. One of the bookkeeping rooms should have an office similar to the one mentioned for junior business training to permit advanced students to handle the records of various school enterprises. Formerly these offices were used in direct connection with bookkeeping instruction, but they are now necessary for extra class work of the kind mentioned under junior business training.

While it is not intended to teach the professional use of machines in a bookkeeping class, yet it is important that students become somewhat familiar with the simpler kinds of equipment used in the accounting room of any modern office. Every bookkeep-

ing room should be equipped with several kinds of adding machines, one or more calculating machines, and possibly a regular bookkeeping machine. In the business office of today we do not expect the bookkeeper to run the risk of making his computations with a pencil, and, hence, we should not demand that our student bookkeepers depend entirely on their pencils. Let them have equipment that will make it possible for them to check their work and be definitely assured of its accuracy.

Most typewriting rooms are as noisy as a boiler factory. This is not necessary, if in the construction of these rooms, a noise deadener is placed in the ceiling. There are several patented ceilings that will positively cut down the noise of these machines fully fifty per cent. Another cause of noise is the type of desk used for the typewriter. If a table with a heavy slate top is used the noise will be appreciably lessened. These tables should be 26 by 72 inches and should be so constructed as to allow the student to sit with both legs under the table in a comfortable position. An adjustable chair is quite desirable because of the varying sizes of the students. However, most adjustable chairs soon get out of order and have to be adjusted period by period so that it is about as well to have common light chairs and have a few tables of varying height to take care of the unusual student. This room should have cabinet space built up in sections for thirty students each. The size of the individual shelf should be 3 by 10 by 18 inches. Each section should be equipped with a door that can be locked after the class to avoid other classes disturbing papers.

A small room opening off of the typewriting room should be provided for the use of advanced students in office practice. This room should be equipped with a good mimeograph, a mimescope, ditto machine, and a multigraph, together with the neces-

sary equipment for these machines. Sufficient cabinet space should be provided to hold the supplies for these students.

Either as a part of the above room or in a small room adjoining another typewriting room there should be sufficient equipment for the instruction on the dictaphone. The students taking dictaphone work will be few in number and a room that will hold eight typewriters with dictaphone connections for that number will fully answer the purpose even in a large high school. It requires such a little time to become proficient on this machine that it is debatable whether it should be provided at all. The dictaphone is becoming so common that introduction of this instruction seems perfectly justified if kept on a fairly small scale.

The shorthand rooms should also be equipped with tables 26 by 72 inches. It is advisable that these tables be fitted with inkwells to provide for ink work in shorthand. In advanced classes the teacher often prefers to have her students grouped around her. The use of tables makes this room very flexible. The tables should be set far enough apart so that the teacher may inspect each student's work without confusing those around her. This room should be equipped with several good dictionaries. Cabinet space is not needed in this room except to provide storage space for the teacher.

In this discussion of commercial rooms and their equipment, there has been an evident plea to keep the furniture simple. It is entirely unnecessary to provide big, expensive typewriting desks of the kind that fold the machine away and provide filing space in a series of drawers at the side. In the first place a room can be filled with tables such as has been suggested for the price of only a few of these desks. Then the typewriters are being constantly jammed in the closing of these desks by

careless students. The keys to the drawers are being constantly lost and a persistent source of annoyance. The same can be said for the cumbersome bookkeeping desks seen in some schools. They are too bulky and too costly. It is better to get a simple type of desk and spend more money upon a few machines that will teach the student some familiarity with office equipment. If we are to expect the commercial teacher to secure the best results from her efforts we

must furnish her with all the appliances that are used in her field of instruction. With the equipment and arrangement of the room suggested in this article many of the commercial teachers could and would turn out a superior product. In building a new high school, let every superintendent study the needs of each particular commercial subject before he determines the size of the room or the equipment that he will place in it.

THE SOCIAL-STUDIES CLASSROOM EQUIPMENT

CHARLES EDGAR FINCH

*EDITOR'S NOTE: Mr. Charles Edgar Finch is director of junior-high-school grades and citizenship, Rochester, New York. He is recognized as a leader in the development of the modern social-studies program for secondary pupils. The outline for a three-year social-studies course, prepared recently by a committee of Rochester teachers under the direction of Mr. Finch is a valuable contribution to the field of curriculum materials. Not only has Mr. Finch efficiently and sympathetically guided the social-studies program in his home city but he has aided the Department of Superintendence of the National Education Association in the preparation of their yearbooks and has written several textbooks. His most recent book is *Guideposts to Citizenship*.*

H. H. V. C.

Until quite recently the subject of social studies has not been considered of importance enough to demand special classroom equipment. With the coming of the junior high school there has been a decided change in this point of view. Directed study has called for a new technique of teaching which insists that definite time under the most favorable circumstances be given to real study, not to "lesson learning," as Morrison puts it. This has necessitated a new type of assignment that requires most careful planning and preparation on the part of the teacher. It has done away with the study of one textbook and substituted the use of supplementary books. Adequate library facilities have become absolutely essential.

Class activities under the new plan have led to the collection of material, have made

group conferences desirable, and have compelled a type of work that calls for greatly increased equipment along many lines. The social-studies classroom has become a work-room demanding a laboratory setting, laboratory treatment, and laboratory supplies quite as much as natural science, where special methods and elaborate equipment have long been considered so absolutely essential.

Progressive teachers have done what they could in the way of transforming their classrooms into social-studies laboratories, but efforts along this line would be greatly facilitated if special consideration could be given to this subject when schools are planned and classrooms are assigned to the various types of work. The social-studies department in a junior high school should be located in a section of the building con-

venient to the library. Storage facilities should be planned that are easily accessible to this group of rooms. The storage room should be equipped with adjustable hooks or arms to hold roller maps. It should have steel filing cabinets where mounted pictures and outline maps can be conveniently stored and made most easily accessible to the teachers in this group. Steel receptacles should also be provided for lantern-slide containers, as well as for large graphs and charts. Unless the library is of unusual size this room should contain storage facilities for books, bound copies of magazines, and other reference material used when certain parts of the course of study are to be followed by a particular class or group of classes.

The storage room might well be a part of a departmental room which should be provided for the teachers of this group. In this teachers' workroom there should be desks where teachers may work during free periods. A typewriter and a mimeograph or some kind of duplicating machine should be provided so that the teachers may duplicate outlines and other necessary data for the use of their pupils. Material of this kind is most essential in carrying out effectively the new type of assignment which is absolutely vital to the right kind of teaching in this subject. This room should also be equipped with bookcases so that a departmental library of reference books and other working materials may be easily accessible to teachers preparing work for their classes. Copies of new social-studies books should form a part of this library equipment and thus be available for experimentation and growth.

If possible the classrooms should be larger than the ordinary classroom in order to facilitate the best use of the movable furniture with which this type of room should be equipped. In reference to the movable furniture it should be said that some teachers prefer tables and chairs so that the

pupils may work in groups; others like the combination movable desk and chair; while still others prefer fixed desks and chairs in part of the room, with tables and chairs for the use of groups in another part of the room. Each teacher should have a flat-top desk which has adequate drawer space so arranged that the daily materials needed can be easily and quickly found. This is an essential part of the equipment of every classroom. Built-in bookcases, large enough to hold an adequate supply of textbooks, are an absolute essential. A filing cabinet for cards and mounted pictures will add greatly to the efficiency of the classroom equipment.

Good blackboard space is another essential in a social-studies classroom. In the front of the room it is well to have a section of movable blackboards with bookcases and regular blackboard space on each side of this section. The side of the room opposite the windows should also be used for blackboard space. In the rear of the room there should be a cork bulletin board to conform with the blackboards on the side of the room. It is also well to have a cork bulletin board from eighteen to twenty-four inches wide across the side of the room above the blackboard.

Each room should be equipped with base plugs conveniently located to provide quick service in the use of the lantern, the projector, or some type of portable motion-picture machine. There are many types of portable lanterns that are inexpensive but serviceable. A lantern with a projector equipment that permits the showing of maps, pictures, and cards is the most desirable type in the social-studies classroom. To be fully up-to-date, the department should own a portable motion-picture machine of some type for showing narrow-gauge film which is noninflammable and does not require a booth. There should also be available for use in the social-studies

department a phonograph with a supply of records reproducing patriotic music, speeches of great statesmen, sections of the great documents of our history, such as the Declaration of Independence and the Constitution.

The laboratory equipment of each room should include shelves for displaying models; exhibit cases for the display of articles loaned to the school or collected as a part of a permanent museum; large steel cabinets for storing work under way; necessary drawing tools and equipment, such as drawing paper, drawing equipment, paste and water colors. The room should also have as part of its library equipment an unabridged dictionary; an encyclopedia; and statistical reference material, such as the World Almanac, the Readers' Guide to Periodical Literature, and Who's Who in America; also a set of good school atlases, historical and geographical.

Maps are an indispensable part of the equipment of a social-studies classroom. Maps used frequently should be of the roller type mounted in a way that will make them easily portable and interchangeable so far as the fixtures are concerned. Maps used on special occasions or for a particular topic may be of the folded type to be hung on hooks fastened above the blackboard. The eyelets in these maps and the hooks in the wall above the blackboard should be spaced a standard distance apart. The objection to this type of map is the fact that it takes blackboard space and cannot be as easily and quickly removed as the roller type. Unless the classroom is particularly large, maps on tripods are in the way and pupils are apt to stumble over them.

Each social-studies classroom should have a map of the United States; a map of the particular State in which the pupils live; a map of Europe; a map of the world; and, in States where counties are emphasized, a map of the county. The general storeroom

should have available for use when needed, maps of South America, Africa, Asia, Australia; also maps that are most helpful and desirable when certain units of history and civics are being studied. As a part of the general equipment, slated or blackboard outline maps of the several continents should also be available for use in the several classrooms. Maps of this type that are to be used for a considerable length of time in the various classrooms should also form a part of the classroom equipment. Two types of globes should also be included in this equipment: one, a globe with political outlines clearly marked; the other, a blackboard globe having the outline of the continents and main lines of latitude and longitude indicated by white lines.

In selecting maps and charts the following suggestions prepared by the Cleveland Junior High School Map Committee should prove helpful. The rating of this committee is based upon the consideration of the following seven important qualities:

1. *Purpose of map*—a map should be rated as to whether it will answer the purpose for which it is to be used.
 - a. Quick and convenient reference on miscellaneous questions—combination physical and political maps.
 - b. For illustrating special physical or social problems as developed in class, and for testing knowledge of special problems—outline maps, blackboard, and desk.
 - c. For illustrating directions and world trade routes—world map, Mercator's projection or globe.
 - d. For showing physical features—physical map.
 - e. For teaching names, locations, and boundaries of political divisions—political maps.
 - f. For teaching winds and rainfall, and other weather conditions—physical map

with prevailing winds and ocean currents shown.

2. *Accuracy*—consider the accuracy with which physical features are presented on the map. The scoring of a map on this item, and on item 3 below, calls for expert or specially trained teachers. Authors of maps should be able to present evidence of scientific checking as to accuracy.

3. *Up-to-dateness*—features of the map should be kept up-to-date.

4. *Legibility*—the visibility of a map should be checked at distance of from ten to thirty feet.

5. *Ease of handling*—a roller map in a cylindrical steel case is usually easier to handle than in a wooden case. Single maps are usually more convenient to use than collections mounted together, but in some cases several maps may be mounted on rollers in the same case, if there is easy interchangeability of rollers. Some teachers advocate, for special purposes, folded maps with eyelets. In such cases the eyelets should be spaced at a standard distance. A map rail with adjustable hooks may solve this difficulty.

6. *Durability*—consider weight, flexibil-

ity, strength, surface, reinforcement at points of hard usage.

7. *Artistic merit*—consider color values, borders, and mountings.

In this discussion it is assumed that the school has a library and a trained librarian. The problem-project plan, the committee research-and-report method, the individual-contribution idea all demand the opportunities afforded by a well-equipped library. Here the children may find data for their special assignments, may work with others on committee reports, may enjoy the sidelights of fiction, may gather data for class dramatization, may assemble facts for class debates, or may look up material on current topics. Under the direction of a competent librarian they will learn how books are arranged on the shelves of a library; how card catalogues aid in finding books; and how to use the common tools of the library, such as the encyclopedia, the World Almanac, the Readers' Guide to Periodical Literature, or Who's Who in America. Thus the library becomes an indispensable part of the equipment for social studies in a junior high school seeking to realize the ideals for which this unit in the school system stands.

A JUNIOR-HIGH-SCHOOL BUILDING PROGRAM

RAYMOND C. BURDICK

EDITOR'S NOTE: *Raymond C. Burdick is the progressive superintendent of schools of Watertown, New York. By his careful planning and supervision, Watertown is the proud possessor of two adequate, economical, complete, and attractive junior high schools.*

H. H. V. C.

Any school building program must of necessity take into consideration the value of the dollar. To build the cheapest building does not necessarily give final evidence of an economical building. On the other hand, the most elaborate exterior and the most spectacular corridors or office are not conducive to practical economy. The

building best planned to take care of all the child's activities is the most efficient, although we do admit that there is also need for some artistic ornamentation and orientation.

During the past year, Watertown has built two junior high schools. These buildings are located at opposite ends of the city

on a circle of a mile radius. The South Junior High School will eventually accommodate one thousand pupils, and the North Junior High School will take care of four hundred and fifty pupils. Both schools have been built to provide for all pupils of the city in the seventh, eighth, and ninth grades, and are adaptable for those activities which make for a real junior-high-school program, including spacious playgrounds and athletic fields.

The South Junior High School is divided into special units. In each corridor are recessed lockers for every individual pupil. On the lower floor are located the boys' shops, which include printing, woodworking, sheetmetal, electricity, and auto mechanics. There are also the boys' showers, lockers, and men's faculty room on this floor. The boys' lockers are near a direct entrance stairway from the gymnasium. On the south side of the building is the gymnasium which is divided into two sections by a roll drop curtain, so that physical training can be carried on by the boys and girls at the same time. There are two office rooms, one storeroom for the physical-training teachers (man and woman), and a balcony for spectators. Leading down a separate stairway from the girls' section of the gymnasium are the girls' locker and shower rooms. Just above the boys' shops is the home-economics unit. This consists of cooking, sewing, home-nursing and fitting rooms. Next to these are the mechanical-drawing and art classrooms. In the front of the first floor are the private and general administrative offices and the children's clinic room. The clinic room utilizes the main office as a waiting room. Adjoining the clinic room is a teachers' locker and rest room. Surrounding this suite of rooms are the social-study classrooms.

At the north end of the building is a large auditorium which will accommodate

ten hundred thirty-six pupils. It contains a moving-picture booth and a large stage. The stage has been patterned after a regular theater stage. A music room leads directly off from the stage so that it can be used as a dressing room as well as a classroom. Next to the music room is a storeroom for band instruments and for music supplies. The auditorium and gymnasium have been built so that the rest of the building can be shut off, with front entrances leading directly into each wing. The heating plant has separate units for each of these wings.

In the center of the second floor is the library with two special conference rooms leading directly into this. On this floor are all the English classrooms, so that children will find the library near at hand. In the north wing of this floor is a well-equipped cafeteria and kitchen, which will take care of two hundred pupils at one sitting. This is separated from the rest of the building, so that fumes will not be circulated throughout the building. The cafeteria can also be used as a study room or a place for band practice.

In the front of the third floor are two large general-science rooms and a biology room. These are equipped with a demonstration table and supply cases. At the south side are the commercial classrooms, and at the north end are the classrooms for mathematics.

Each classroom is equipped with a teacher's supply cupboard, cork bulletin board, telephone, and clock. Every room is also equipped with an electric plug for visual instruction.

In this building, there are 1,263,883 cubic feet. The site, building, and equipment together cost \$470,000. Of this amount, \$408,000 was the cost of the building, which would be 32.3 cents per cubic foot, or \$408.00 per pupil. The building is fireproof, with steel-bar joist construc-

tion and concrete subfloors throughout. The exterior is constructed of face brick and litholite.

The North Junior High School is built of the same fire-resistive construction, although of a different design. On the basement floor are a girls' and boys' shower locker room. The northwest wing is a combination auditorium and gymnasium with moving-picture booth and stage. Folding chairs are used which are stored on trucks under the stage. It is planned to build a separate auditorium on the northeast wing, and the combination will then be transformed into a gymnasium when the school grows large enough.

On the first floor, across from the auditorium-gymnasium is a double boys' shop with glass partition, which separates a print shop from a composite shop, including wood-working, auto mechanics, and electricity. In the front part of the building are the administrative offices, a clinic room, and teachers' rest room. On one side of this are the mathematics classrooms, and on the other side are the commercial and social-science rooms. Near the auditorium-gymnasium is a music classroom.

On the second floor is the girls' home-economics department, including a cooking and sewing room and a combination room which is used for a lunchroom and class-

room. In the center of the building is a library, with two adjoining conference rooms. On one side of the library are the English classrooms, and on the other side is a large science room for general science and biology. In the southeast corner is a room for art and mechanical drawing.

In this school there are 608,380 cubic feet. The site, building, and equipment cost \$210,000. The building, including architects' fees but exclusive of equipment and site, cost \$197,000, which would amount to 32.4 cents per cubic foot, or \$437.00 per pupil.

Both of these buildings meet every educational requirement. Lansing & Greene were the architects, who engaged the services of Strayer and Engelhardt of Teachers College, Columbia University, as the educational advisers.

These buildings do not have elaborate decorations, but they are both designed to be pleasing in architecture as well as practical. While they do not possess extravagant exteriors, yet they have good appearance without any indication of waste. Such buildings as these are worthy of any community and give every evidence that sane economy can be used in carrying out a junior-high-school building program anywhere in the country.

TABLES SHOWING VARIATIONS IN SCHOOL COSTS

The tables given below were compiled by Mr. Burdick while making an intensive study of elementary- and junior-high-school costs at the time of planning the recent building program which is just completed. Recently built schools are referred to by letters rather than by names.

JUNIOR HIGH SCHOOLS (1925-1929)

No. of School	Type	Cost of Construction	Cubic Feet	Cost per Cu. ft.	Capacity	Cost per Pupil
1	B	\$423,939.02	1,132,154	.38	1,000	\$423.94
2	A	475,221.35	1,665,000	.30	1,400	339.44
3	A	1,614,309.00	3,214,964	.50	3,000	538.10
4	B	423,153.00	1,536,578	.28	1,250	338.52

JUNIOR HIGH SCHOOLS (1925-1929)—Continued

No. of School	Type	Cost of Construction	Cubic Feet	Cost per Cu. ft.	Capacity	Cost per Pupil
5	A	1,036,000.00	2,795,421	.37	1,800	575.56
6	A	1,324,472.00	3,361,972	.39	2,200	602.03
7	A	280,663.08	1,438,600	.20	1,400	200.47
8	A	275,000.00	761,900	.36	800	343.75
9	A	1,195,364.00	2,877,809	.42	2,000	597.68
10	B	202,875.53	496,640	.41	450	450.83
11	A	242,000.00	831,423	.29	480	504.17
12	B	617,577.00	2,146,000	.29	1,200	514.65

ELEMENTARY SCHOOLS (1925-1929)

No. of School	Type	Cost of Construction	Cubic Feet	Cost per Cu. ft.	Capacity	Cost per Pupil
1	B	\$189,411.20	421,487	.45	500	\$378.82
2	B	169,673.00	518,032	.33	954	275.71
3	A	266,000.00	455,898	.58	890	298.88
4	A	334,134.00	657,000	.51	600	556.89
5	B	502,405.00	945,000	.53	1,280	392.50
6	A	453,190.65	1,507,000	.30	1,728	262.26
7	*A	338,500.00	586,906	.58	700	483.57
8	*A	495,000.00	1,333,000	.37	1,350	366.67
9	*A	390,233.00	775,000	.43	564	584.00
10	*A	346,308.00	775,000	.39	564	531.00
11	A-O	197,283.00	632,700	.31	800	246.60
12	B-N. Y.	307,982.10	864,000	.36	740	416.19

*Same city—same year.

PRESENT STANDARDS AND EQUIPMENT OF THE HIGH-SCHOOL LIBRARY

HUMPHREY GAMBIER-BOUSFIELD

EDITOR'S NOTE: Mr. Bousfield, who is now chief of the readers' department of the Washington Square Library, New York University, was formerly an instructor of English in the high-school division of the Columbia Grammar School in New York City.

D. I. M.

There is a general tendency at the present time towards dispensing with textbooks in the schools, especially in the secondary schools, and relying to a greater extent on the more general facilities of the school libraries. Such a practice is advantageous

in several respects. Using the school library makes it possible for the pupil to become acquainted with a much wider field of literature than that presented to him by the comparatively few texts and school editions of standard works which come into

his hands in the average four-year English courses. Then, again, the use of the library tends to develop the habit of browsing through books, which is one of the most valuable things a student can do from the point of view of the information of a general nature which such wandering through a library gives.

The growth of the library in the secondary schools is a comparatively recent development. The Central High School in Cleveland was the first school to have a library. This was in 1895. A similar experiment was tried in Newark, N. J., in 1899. In both these cases the libraries established in the schools were really an expansion of the public library and were not an integral part of the school. Such branches were designed to serve the adult public residing in neighboring localities. During the early years of school-library development, progress in this direction was very slow on account of the teaching methods then in vogue which did not require extensive reading. Instruction, for the most part, was narrowed down to the few textbooks used.

Later, scientific methods of instruction gradually came into vogue resulting in tests and measurements and school surveys. Concurrently, school libraries began to grow. Since about 1910 the secondary schools have attempted to formulate objectives of education and have studied the curriculum with the emphasis placed upon the relation of the subject to the pupil. An educational viewpoint which thought of the educative process in terms of the pupil can only be characterized as a radical departure from the former principles of educational practice. This change in point of view developed gradually but steadily. It was not long before the new consideration of the purposes of education brought about, among those interested in and concerned with education, a change in attitude towards the

relative value of books. These changing opinions could be grouped as follows, summarized from *The High School Library; Its Function in Education*, by H. Logasa.

1. At first the educator focused attention on one book used as a text.

2. Gradually teachers adopted the practice of using the textbook, with the auxiliary aid of many copies of a few selected books which served as texts or as supplementary reading.

3. The next step was towards the use of the textbook, with much supplementary material of a reference type designed to enrich the bare subject matter taught in the classroom, and a large number of books to furnish reading experience. This was the change in method that necessitated the introduction of a school library.

4. This last and most modern development favors the possession of a textbook by each member of the class with a number of books in the classroom—books which deal with the subject under discussion, and additional books and illustrative material on the topic in the school library. This arrangement requires a central school library with branches in every classroom. The collections in the classrooms change with every new topic taken up.

As schools and the numbers in each class became larger, the number of books required by each teacher became correspondingly large. The collection cared for by each teacher became unwieldy and took a disproportionate amount of the teacher's time. This condition, combined with the new ideas developed by surveys, etc., led finally to the situation outlined in item number 4, above.

By the year 1915 it was felt that some standards for secondary-school libraries were needed, so in this year the Department of Secondary Education of the National Education Association determined to take steps in this direction. The Association

appointed a library committee which investigated actual conditions in high-school libraries throughout the United States and made their findings known to administrators of the schools. At the next meeting of the National Education Association in New York City, it was voted that the committee should continue its work and that it be authorized to work out a program of general library development. The final report of the committee was issued in 1918 and was endorsed by the American Library Association and the North Central Association of Secondary Schools and Colleges. It is an indispensable guide to the organization of an adequate library for any school from the junior-high type to the senior high school with an enrollment of several thousand. The following requisites of a standard organization are laid down in this report. Summarizing from Fay and Eaton's book, *The Use of Books and Libraries*, these requisites are: (1) appropriate housing and equipment; (2) professionally trained librarians; (3) scientific selection and care of books, including proper classification and cataloguing of this material; (4) instruction in the use of the library; (5) adequate annual appropriations for the payment of salaries and purchase of books, etc.; (6) a trained librarian as State supervisor.

In this article I shall omit any lengthy discussion of the matter of books, salaries, and appropriations and will deal at greater length with item number 1, the proper housing and equipment of the library, the clause of the National Education Association's report including the more mechanical aspects of the organization of the high-school library. A list of some of the items to which due consideration would have to be given preparatory to the establishment of an efficient school library would include a discussion of general reference books, government publications, periodicals and peri-

odical indexes, arrangement of the books on the shelves, whether they are arranged by Dewey or Library of Congress classification systems, the use of the catalogue, and, in connection with this, the use of an author-title-subject catalogue. But these details can be taken care of by the trained librarian. The responsibility can be taken off the shoulders of the superintendent or the principal, although he certainly should know something about what is being done in his school library.

The public libraries have shown that readers can be induced to change their tastes in reading matter and that there are means by which readers can be encouraged to appreciate better books than those which they have been using habitually. Changes can be made along these lines in the high-school libraries. Students can be led, not driven, not only to appreciate but to enjoy books of a higher type. In fact, enjoyment must precede appreciation. Interest comes before both. Interest must be aroused.

Mechanical details as well as the organization of the library play an important rôle in developing a genuine fondness for books in a group of adolescent pupils who merely have to be interested in order that they may like to read. Some of the general considerations underlying the organizing of the school library upon which successful functioning depends to a large extent are briefly given here.

Books must be readily available and suitably located. They must be so placed that they can be obtained quickly for the readers. The rush of modern life is reflected in the high-school population. Interest in a book decreases in proportion to the difficulty experienced in getting the book. For this reason the books should be in the high school and not in the public library. Actual cases have shown that while the pupils will use the high-school library willingly, noth-

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ing short of force is required to send the pupils a few blocks to the public library.

The location of the library within the school is important. It should be in use all day and should therefore be centrally located and in close proximity to both classrooms and study hall. There is no justification in building the library in attic or basement or in some out-of-the-way corner of the building because there it might take up less room. It is unwise, also, to place a collection of books in the principal's office. This is carried out in practice sometimes and the practice has proved unsatisfactory because the dignified air of the administrator's office tends to impart a restraint upon the pupil.

If the library is not used, something is wrong. Either the pupils have tried to use the library and have not been able to get their desired material because of the librarian's failure to assist them or the equipment and atmosphere are unattractive; or, perhaps the library is not sufficiently stocked with books, interesting periodicals, and pamphlets.

Freedom in the use of the library is important. As far as possible the pupil should be allowed access to the stacks so that he can browse among the books.

The library must be attractive. When the indifferent reader wanders in, he must feel a welcoming, homelike atmosphere. Proper regard for mechanical details is most important in this respect as lighting, heating, appearance and arrangement of furniture. These are indirect factors but they are important in developing a fondness for reading.

The reading room should be planned to accommodate about ten per cent of the total enrollment. Seating capacity at a table is estimated at three feet for each reader's chair. The space between the tables should not be less than five feet. Of course, local conditions may limit the available space.

High windows are best for library rooms as they admit light to the tables as well as to the stack shelves which, in school libraries often surround the reading room, the tops of the stacks being reached by means of a balcony. Switchboards should be kept out of sight as pupils are sometimes inclined to be meddlesome. The librarian's office is a good place for switches.

There should be taste in the tinting of the walls and the finish of the furniture. Pictures and busts, colorful posters, and a bulletin board with up-to-date information all make the library a more attractive place. Sound can be deadened by the use of a floor covering such as cork carpet or battleship linoleum.

The card catalogue is an important piece of furniture. It should stand on legs to make the lower trays easily accessible.

Heating and ventilating the library should be given careful consideration. As steam is used in most school buildings, this is also used for the library and is, fortunately, the best method of heating. If radiators are in a conspicuous place, they can be covered. It is better to conceal them behind book cases, the radiators being set into the wall with suitable space above to allow for circulation of the heat. A convenient place for radiators is under benches. Available space should be used for other purposes than the storage of radiators.

The location of the librarian's office, or the librarian's desk (if the library is small), the location of the reference librarian's desk, and the position of the charge desk all depend on the plan of the library. Whatever the arrangement, it should be made with the purpose of eliminating unnecessary movement and consequent waste of time.

A small room adjoining the library can be used for classes of instruction on the use of the library and for talks on books. The librarian may use such a room for giving talks or for leading discussion on cur-

rent topics. The use of the reading room for instruction is most unsatisfactory. If the library is used so little that there is room to hold classes, it would be far better to close off a part of the room with some standard make of wall board and to make

additional classrooms in the newly partitioned sections. In this way the room will not be spoiled for those who do use it. The reading room should be kept as a reading room and should never be used for other purposes.

CORRESPONDENCE STUDY IN THE SMALL HIGH SCHOOL

FORREST E. LONG

Among other pressing problems of the small high school is the one of giving to the pupil an offering which will approach, in comprehensiveness, the offering which is found in the average large school. As long as the high school was thought of as an institution which should feed its pupils with academic diet, rather difficult to digest but, withal, extremely savory in retrospect for those who were fortunate or unfortunate enough to survive, the high school menu of courses needed only to include a few carefully chosen dishes such as Latin, mathematics, formal history, and English with now and then a dash of science. Today, it is known that more attention must be given to needs which were formerly nonexistent or unrecognized. The vitamins of the intellectual diet are being discovered and it is only right that the pupil attending the small rural high school should have the same chance at the balanced diet that is offered his more favorably situated city cousin. Correspondence study is likely to open the way for many small high schools to enrich their offering at a cost which will not be prohibitive. The addition of correspondence courses will also furnish a means whereby the small high school may serve the adults, in the com-

munity, as well as those of "secondary school age."

In order to test the effectiveness of correspondence study it is hoped that some State may adopt a plan similar to the following and carry it out on a large scale. If it proves to be as efficient in practice as it appears to be in theory it is likely to be taken up by all States.

THE PLAN

It is proposed that the appropriate officials in a State, presumably in the State department of education or the State university, organize a correspondence-study department for the purpose of co-operating with high schools in the State in enriching their programs of study. It is further proposed that in each small high school a room or rooms be set aside for the use of pupils who wish to enroll in correspondence courses. The courses, prepared by the State officials, should be sent to the principals of the small high schools who should pass them on to the pupils. The pupils enrolled in correspondence courses should be expected to spend a stated period in the correspondence study room or rooms each day. Each room should be in the charge of a teacher who may or may not

have had training in the several fields being studied by the pupils. As the lessons are completed they should be returned to the central office for comments and criticisms.

It should be held in mind that this suggested plan of correspondence study is not presented with the idea of substituting it for conventional class work. It is presented merely as a supplement to the work done in the regular classroom whereby some pupils may secure courses which are not open to them at the present time.

AN EVALUATION OF THE PLAN

It is out of the question to present a conclusive criticism of the suggested plan for the reason that few reliable data having a bearing on correspondence study are available. There is little information showing the efficacy of instruction by correspondence and still less information showing the effectiveness of correspondence study on the secondary-school level. In evaluating the suggested plan consideration must be limited to rather general data in lieu of specific facts.

The problem may be divided into two parts as follows: First, is the correspondence-study idea founded on sound educational principles? Second, even though the correspondence-study idea may be approved for certain qualified adults, is there any evidence that it is or would be effective with secondary-school pupils?

Facts are not available at present showing the merits of correspondence study; however, some objections may be voiced to the plans as they are functioning at present.

OBJECTIONS TO CORRESPONDENCE STUDY¹

"High-powered" salesmen, representing commercial correspondence schools, have no doubt induced many unqualified persons to enroll for correspondence courses. It is to

be expected that when these students recognize their deficiencies they are likely to condemn the entire correspondence-study idea. An allied criticism is that students who are qualified for certain types of correspondence study have been permitted to enroll for courses which are not suited to their needs. Due to this lack of guidance or scientific discrimination between courses disappointment has likely resulted.

The suggested plan of correspondence study would no doubt encourage many secondary-school pupils to enroll in courses which they would never finish. However, there would be no salesmen to influence the choices. It will probably be a long while before education of any kind eliminates "misfits and disappointment." Whether this plan of correspondence study would foster misplacement of effort to such an extent that its effectiveness would be neutralized, is a question. The University of Chicago has taken special precaution "to ensure a reasonably successful issue in event of enrollment" in one of their courses and Hervey F. Mallory, secretary of their Correspondence Study Department writes: "All preliminary precautions, however, do not eliminate misfits and disappointment. Nevertheless, the ratio of those who prove unprepared for the course or courses they have chosen is less than one to sixteen, perhaps less than one to twenty."²

Whether the work on the secondary-school level could be handled with such a high degree of efficiency is a question. Certainly for most of the courses preliminary tests might be given to determine qualifications and aptitudes.³

¹ Hervey F. Mallory, "Teaching by Correspondence in the University of Chicago," *Proceedings, National University Extension Association*, 1916, p. 44.

² *Success Through Vocational Guidance*, The American School, 1922 (an attempt by a private correspondence school to handle this problem).

¹ John S. Noffsinger, *Correspondence Schools, Lyceums, Chautauquas*.

A second objection to correspondence study, as ordinarily organized, is the fact that some students are unwilling to carry a task, once undertaken, to a successful conclusion unless some very real pressure is brought to bear on them. Otherwise stated many do not possess sufficient perseverance to complete correspondence studies as they are ordinarily organized and taught. Professor Schlesinger of the University of Chicago considers lonesomeness of correspondence-study work the greatest difficulty the student has to overcome.*

The plan outlined for the small high school provides for regular attendance in the correspondence-study room or rooms and the general supervision of teachers who should be responsible for keeping the pupils at their tasks. This common effort should tend to overcome the objection of lonesomeness and should provide sufficient pressure to ensure consistent work even on the part of secondary-school pupils, if they are intent on learning. Even with the conventional plan "the University of Wisconsin found that of 24,555 registrations, in ten years, 10,492 courses or over 40 per cent were completed."⁵

It is likely that one of the major criticisms of correspondence study is that it eliminates the personal contact between pupil and teacher. No doubt this would be an important argument against the suggested plan of correspondence study if the courses were handled by some instructors. However, there is some evidence, of a subjective nature, to show that this objection may be overcome by expert teachers. Professor Smithson quotes⁶ a professor of Eng-

lish in the University of California as follows: "When I recall the persons I have taught in classes at the University of California and those I have taught by the correspondence method, many of the later stand out the more clearly as individuals."

Professor Chase has written as follows:⁷ "The teacher, experienced in dealing with boys and girls, young men and young women, who has learned their mental habits, their intellectual reactions to his subjects, their common difficulties, can come to know each student through his written recitations though he has never seen his face, and can adapt his teaching, lesson by lesson, to his need as the lesson papers progressively disclose it, supplying interpretations as need calls for it, giving the sort of guidance that the special case requires and affording requisite stimulus, motive, and encouragement."

A student wrote to the University of California:⁸ "It was with hesitation that I began the correspondence course, for I had always felt that the instructor's personality contributed much to the worth as well as to the interest of a course. It seemed likely to me that in a correspondence course personality would be so indistinct as to be negligible. I am glad to say that your comments and letters spurred me on to increased effort more than the presence of an instructor in a classroom ever did." It should be pointed out that this student had never been in a class conducted by this instructor hence the comparison can scarcely argue for the superiority of correspondence study. The statement does indicate that the personal element may be present in correspondence study and teaching.

Klein states that correspondence study "is an individual method of instruction, almost the only one now practised on any

* Herman I. Schlesinger, "The Teaching of Science Courses by Correspondence," *Proceedings, National University Extension Association*, 1924, p. 184.

⁵ Arthur J. Klein, *Correspondence Study in Universities and Colleges*, United States Bureau of Education Bulletin, No. 10, 1920, p. 34.

⁶ George A. Smithson, "Teaching English by Correspondence," *Proceedings, National University Extension Association*, 1925, p. 96.

⁷ Wayland J. Chase, "Teaching by Mail," *Proceedings, National University Extension Association*, 1916, p. 66.

⁸ George A. Smithson, *op. cit.*, p. 96.

large scale. . . . In correspondence study each student receives continuous individual attention and assistance to meet his special needs throughout the course."⁹

Even though agreement is not had with the optimistic attitudes pictured above, it is not likely that lack of personal contact between student and teacher will be considered serious enough to negative the suggested plan. No doubt many other criticisms of correspondence study could be listed but those named above appear to be most prominent in the literature on the subject.

ARGUMENTS FOR CORRESPONDENCE STUDY

The arguments favoring the correspondence-study idea center in the fact that it is being used extensively and is being approved by those who are teaching by this method. Accurate statistics are not available showing the number and types of pupils pursuing correspondence courses, but Noffsinger indicates¹⁰ that one million five hundred thousand students enrolled in private correspondence schools in the United States in 1924. At least twenty-eight¹¹ universities of first rank offer correspondence courses and "all except one or two give college credit for such work."¹²

In twenty-six higher educational institutions and the Massachusetts Department of Education 57,985 new enrollments were made in 1924 and in seventeen of these institutions and the Massachusetts Department of Education, 28,392 courses were completed the same year.¹³

⁹ Arthur J. Klein, *op. cit.*, p. 10.

¹⁰ John S. Noffsinger, *op. cit.*, p. 16.

¹¹ Seventy-three institutions are listed as giving correspondence courses by Arthur J. Klein, *op. cit.*, pp. 6 ff.

¹² Thomas H. Shelby, General University Extension, United States Bureau of Education Bulletin, No. 5, 1926, p. 5.

¹³ Thomas H. Shelby, *op. cit.*, pp. 8 ff; C. A. Prosser, and C. R. Allen, *Vocational Education in a Democracy*, p. 86; John S. Noffsinger, *op. cit.*, pp. 14 ff.

As suggested above it is not likely that so many students would pursue correspondence courses unless they considered them valuable from an educational point of view. Furthermore, representative instructors using the correspondence method have indicated their approval of the idea. The following quotations are illustrative, many of which might be given:

Some of them (instructors of English in the University of California) took up correspondence work in order to increase their incomes, frankly confessing that they had no confidence in the method of teaching by mail. Every one of them, nevertheless, within a short time became very enthusiastic about the new work, affirming that the results were far more gratifying than were those of their regular university classes.¹⁴

When teaching by correspondence fails to be effective and fails to gain the recognition that is due, we shall have to look out for the rest of the edifice. We must take particular care to preserve the standards in this work. We know that it is effective; we know that it yields educational results, and in that consciousness we have a pledge of continuance and growth.¹⁵

With a few records, and a brief phonetic handbook of which some are already obtainable, the correspondence student has the means of learning at home and inexpensively the sounds of a language, and of indicating that knowledge to his instructor with considerable accuracy.¹⁶

Diligent inquiry has failed to find a single instance where a competent, conscientious instructor has faithfully taught the same subject both in class and by correspondence who does not find words of commendation for correspondence study. Many testify to getting better results by correspondence teaching than in class instruction.¹⁷

In the last eight years it has been my lot to give half of my time each year to residence university work and half to teaching by correspondence, and not infrequently I have had in correspondence courses students I have already had in residence and even more often I have had in residence students I have had previously in correspondence. This

¹⁴ George A. Smithson, *op. cit.*, p. 94.

¹⁵ Hervey F. Mallory, *Proceedings, National University Extension Association*, 1924, p. 170.

¹⁶ O. F. Bond, "The Modern Languages Taught by Correspondence," *Proceedings, National University Extension Association*, 1924, p. 177.

¹⁷ J. W. Scroggs, quoted by Arthur J. Klein, *op. cit.*, p. 9.

has given me opportunity to compare the effectiveness of the two methods, and in this comparison teaching by mail holds its own well. . . . Furthermore, left in larger measure to his own resources, the correspondence student is afforded more opportunity and incentive for independence in effort and so for the development of self-activity, one of the choicest products of education.¹⁸

All who have seriously tried to do correspondence teaching will agree that any subject that can be taught in the classroom can be taught by correspondence if the time and facilities are available.¹⁹

In addition to the favorable testimony of the instructors in correspondence departments, where the instruction is largely limited to academic subjects, it is interesting to note the action taken by the International Typographical Union in 1925. This indicates the importance attached to correspondence study by a group of practical skilled workmen.

Apprentices shall be required to complete the International Typographical Union Course of Lessons in Printing before being admitted to journeyman membership, except with the consent of the president of the International Typographical Union. The president of the International Typographical Union shall have authority to cancel the card of any person admitted to membership in violation of any of the foregoing provisions and may impose a penalty not to exceed twenty-five dollars on offending unions.²⁰

CORRESPONDENCE STUDY AND THE SECONDARY SCHOOL

The objection has been made that correspondence study may be approved for adults but on the secondary-school level there is little justification for such a plan.²¹ The following evidence indicates that the suggested plan for the secondary school has merit.

The Province of British Columbia has provided correspondence study for the sev-

eral elementary grades. Due to the sparseness of the population this scheme was organized in 1919 to care for those pupils who lived so far from a school that it was out of the question for them to attend. By 1925 over 1,120 children had enrolled and in 1924-1925 four hundred children were actually receiving instruction from this department. Director Hargreaves indicates²² the results as follows: "You may take my word for it, this is the best spent money in British Columbia and gives entire satisfaction to parents and pupils."

If correspondence study is successful with elementary-school children working at home under the direction of their parents, there appears no reason why correspondence study would not function in the secondary school under the direction of an intelligent teacher even though he is not trained in all the fields studied by the pupils.

Another fact which indicates the practicability of the suggested plan is the existence of correspondence courses of secondary grade in at least eighteen²³ colleges and universities of reputable rank. Secretary James A. Moyer, of the National University Extension Association, writes that these courses are given "apparently with the idea of preparing the students for admission to higher educational institutions."²⁴

The final consideration which indicates the practicability of the suggested plan is the apparent success of the coöperative arrangement between private correspondence schools and the boards of education in Benton Harbor, Michigan, and Newton, Iowa. In these communities high-school pupils and adults have been permitted to

¹⁸ Wayland J. Chase, *op. cit.*, pp. 66 ff.

¹⁹ Thomas I. Mair, "Co-operation of Agricultural College Extension with University Extension." *Proceedings, National University Extension Association*, 1922, p. 121.

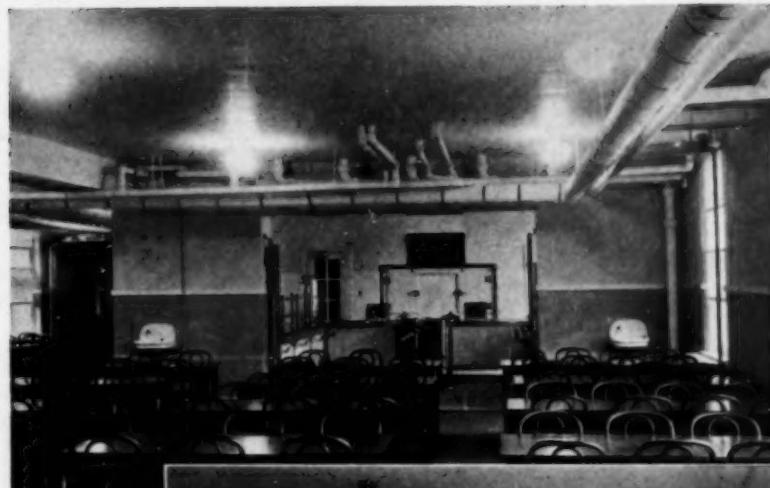
²⁰ Laws of the International Typographical Union, Section 13.

²¹ E. B. Gowin, W. A. Wheatley, and J. M. Brewer, *Occupations*, p. 357.

²² Personal letter to the writer.

²³ Universities of Arkansas, Colorado, Chicago, Indiana, Kansas, Kentucky, Minnesota, Missouri, Montana, Nebraska, Texas, Utah, Wisconsin, Tennessee, Kansas Agricultural College, Pennsylvania State, Brigham Young, Utah Agricultural College.

²⁴ Personal letter to the writer.



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INTERMEDIATE
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SCHENECTADY, N. Y.



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NEWARK, N. J.
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ARTS AND
CRAFTS ROOM



enroll for correspondence courses supplied by the correspondence schools. The courses are paid for from public funds by the board of education. While there is no experimental evidence showing the value of the courses being pursued in these schools opinion seems to approve the plan. Arthur P. Twogood, director of industrial education, Newton, Iowa, writes:²⁴ "Personally I feel there is a great opportunity for the use of correspondence courses in connection with public-school work. Properly developed it should supply the vocational needs of the small-town high school where it is impossible to establish regular vocational courses."

Superintendent Mitchel²⁵ reports that "It has proved very successful indeed. At a recent meeting of the Vocational Education Committee of the Michigan State Teachers' Association, it was decided to recommend our plan for adoption in every high school in the State, where other vocational plans are not under way."

Professor Diamond²⁶ of Michigan University in writing of the plan of operation in Benton Harbor says:

The plan has not been in operation long enough to enable those in charge of it to present definite evidence of material success. However, the results already obtained indicate that correspondence can be fitted into the work of the public school with a great advantage to the pupils and to the school. The pupil gets just the specialized individual training that fits him for his future work. He has textbooks and teachers that suit his needs.

It is believed that the plan will appeal to school administrators everywhere. It should be of particular interest to those in smaller communities where the limitations of a small budget make it impossible to do more in the high school than what is needed to meet the requirements of our higher institutions.

The above listed facts indicate that correspondence study is functioning successfully

and in significant proportions on the adult level. The experience of the authorities in British Columbia, the status of secondary-school courses in American universities, and the apparent success of the plans in operation in Benton Harbor and Newton indicate there is reason to expect the suggested plan to be successful. The final consideration is the expense involved in putting the plan in operation.

COST OF CORRESPONDENCE STUDY

Data are not available to show the total expense of such a comprehensive plan. The charges made by the universities for correspondence courses hardly offer a parallel to the suggested plan. It appears that many of the courses offered by the universities are handled by the corps of instruction during their "spare time." The salaries are paid for residence university teaching and in order to supplement these salaries teachers prepare and administer correspondence courses. In so far as the suggested plan could be administered in this way the existing rates furnish an index of the cost.

An examination of the catalogues of eleven extension departments selected at random shows the median charges for one unit of high-school correspondence work to be twelve dollars with a range from six dollars and sixty-six cents to twenty-five dollars.

The comprehensive plan suggested would likely call for the employment of a corps of instructors who would have to earn their entire salaries through their correspondence work. Whether this would increase or decrease the unit cost can scarcely be determined in advance. Furthermore it is likely that no two courses would cost the same amount.

Possibly an equitable solution of the problem would be to offer the correspondence courses for a reasonable amount, say

²⁴ Personal letter to the writer.

²⁵ Personal letter to the writer.

²⁶ Thomas Diamond, unpublished report on the Benton Harbor plan.

twelve dollars per unit, and obligate the State to handle any deficits which may accrue. The twelve dollars for each unit should be taken from the local school funds.

From the standpoint of the local community the only additional expense would be the twelve dollars for each unit of correspondence work carried on by pupils in the district. The teacher who supervises the correspondence work would be relieved from teaching other courses as pupils choose correspondence work over the conventional offering. The enrollment in correspondence would be offset by the decrease in enrollment in the other courses. Any increases in the total enrollment will represent an additional expense but this is a recognized principle in education. To save all the money spent for secondary education it is only necessary to close the secondary schools. If correspondence study in the secondary schools should increase the enrollment over the present figures the additional cost, over the twelve dollars per

unit, should not be charged to correspondence study but to the expense of educating pupils.

SUMMARY

It is proposed to have each small high school provide correspondence courses, supplied by the appropriate State officials, to care for the needs of pupils who are not properly provided for by the conventional offering of the school. Little statistical or experimental evidence is available to show the feasibility of the plan but the present status of correspondence study in the reputable universities of the United States, in British Columbia, and the apparent success of the plans in operation in Benton Harbor and Newton indicate there is reason to expect beneficial results from the suggested plan. Definite figures are not available for estimating the cost of correspondence study by the plan suggested but judging from the charges made by representative universities it is believed the cost will not be prohibitive.

THE NECESSITY FOR CERTAIN CONTINUOUS INSTRUCTION IN CORE SUBJECTS

FRANKLIN E. PIERCE

EDITOR'S NOTE: Secondary-school men of the State of Connecticut are fortunate indeed to have as their leader a man of such broad interests and untiring energy and tolerance as Mr. Franklin Pierce, supervisor of secondary education, State Department of Education. Before going to Connecticut, Mr. Pierce was principal of the Battin High School, Elizabeth, New Jersey.

P. W. L. C.

The junior high school in its development has not been so restricted by tradition and practice as has the senior high school, except of course for the ninth grade, which has come in for its share of senior-high-school and college domination.

The junior high school also has, because of its greater freedom, and because of the theories, whims, and personal prejudices of its educational directors, developed a program which shows a lack of uniformity

which to the traditional mind is quite appalling.

In order to answer the question of the "necessity for certain continuous instruction in core subjects," we may well inquire concerning present practices. A study of the requirements for high-school graduation made by Carl A. Jessen, Specialist in Secondary Education, United States Bureau of Education, shows that there are certain State requirements for high-school

graduation. Such requirements affect directly the junior high schools. The State requirements in brief are:

In all States the requirements are made applicable to four-year high schools, thus implicating the ninth grade of the junior high school.

The total amount of credit required by the States for graduation ranges from twenty-nine to thirty-six semester credits. Sixteen units or thirty-two semester credits is the median requirement, being uniform in thirty-five States. Thirty semester credits is the standard in ten States.

English is the most universal constant—required in forty-one States; two States require three years of English; nineteen States require four years of English.

Social science follows English closely with a total of forty States requiring some credit in history or other social sciences before graduation. Thirty-four States demand some training in American history. Twenty-two specify that there must be some study of civics either separately or as a part of the American history course. Seventeen States require four semester credits while thirteen States require two semester credits in history.

Laboratory Science. A year's work in elementary science is required in five States. Three other States give the pupil an option between general science and biology or physiology. In one State two semester credits of nature study are required. Twenty-six States require one or more years of science for graduation.

Mathematics. Fourteen States require a year's study of algebra and nine required one year of plane geometry.

Physical Education. Physical education, varying in amount, is required in only seventeen of the States (1928).

Home Economics. A year's work in home economics is a constant for girls in two States.

Foreign Language. Two years of foreign language is a requirement in two States.

A study of the rural junior high school by Emery W. Ferris (Bulletin No. 28, 1928, United States Bureau of Education) is illuminating in that it discloses that replies were received from 135 rural junior high schools out of the 1181 small rural junior high schools solicited. This indicates, first of all, that even the principals of our small junior high schools have become, in a way, questionnaire wise, and, apparently, pay little attention to studies of this nature. The summarization of these replies indicates that there is a demand, which has also been expressed by Koos and Briggs in their studies of the junior high school, for a reorganization of subject matter, selecting, as Koos says, that "which is most efficient in stimulating the essential learnings." It would indeed be interesting to know just what "essential learnings" include.

The study by Ferris shows that definite reports on curriculum constants were received from only twelve States. These reports indicate in brief that English is a universal constant; that social studies and mathematics are almost universal requirements; and that science and practical arts come next in the program. Less than one half of the States reporting make physical education or health a required subject.

The high-school study by Jessen, referred to elsewhere in this article, shows that only seventeen of the forty-eight States require a physical-education and health program, this in spite of the fact that among the cardinal principles of secondary education health stands at the top.

The study also indicates that schools have paid some attention to extracurricular activities, 94.8 per cent of the schools so reporting. It is interesting to note, however, that the most frequent type of extracurricular activities is labeled "athletics."

We may well raise the question as to whether or not an athletic program, including a few of the pupils selected because of their skill and interest in playing one of the athletic games, can be made a substitute for a well-balanced physical-education and health program. Have our educational officials done all within their power to promote the physical-education and health program which they say is fundamentally important?

There is a tendency for State authorities to require evidence of fairly intensive work in two or more departments of study.

A study, by the same authority, of the school requirements for graduation (464 high schools were studied) shows:

That the amount of work required in English is more than twice that in the social studies.

Mathematics is more frequently required than is science.

Vocational subjects slightly predominate over foreign languages.

Approximately one half (sixteen semester credits) of the pupil's work is prescribed for him in the form of constants. In the smaller schools three fifths of the work is prescribed. In the larger schools only two fifths is thus limited. The practice of requiring the pupil to elect a "curriculum" still further limits his elective offerings.

If the central tendencies are accepted as typical, the high-school pupil presents for graduation sixteen semester credits of constants, and in addition completion of a definite curriculum, or one major and two minors. The balance of his graduation requirements comes from the elective column.

It is evident that one half of the pupil's subjects are prescribed for him either by the State or by the local authorities. The subject content, however, is not so limited by authority and is determined by the teacher, the local school authorities, and by State prescription.

We shall next inquire briefly concerning the amount of repetition and omission in the subject content itself in our secondary schools.

Osburn's¹ study discloses in its analysis of textbook material some facts that should be of interest to those studying this topic.

In the field of English composition one fifth of the high-school material has been previously presented in the elementary school. One tenth of the high-school material will be presented again in the college. English composition as presented here covers one year of time (the first year). If there is 30 per cent of duplication in the other three years, then it follows that 1.2 years of a four-year high-school course are spent in studying either what has been previously taught or what will be taught again.

Koos² in his study found that 36.4 per cent of the work in high-school English, composition and literature, is taught again in college.

His study of United States history shows that 22.8 per cent of the high-school material is being taught in college for the second time.

The amount of duplication between the elementary school and the high school is about 20 per cent of the total course.

The textbooks in history contain little that will rank in importance with the tools of knowledge. There are no provisions for creative activity. It is difficult to justify the large amount of factual material that our pupils are getting in these subjects.

Nature of the duplications. In reference to the nature of duplications:

In English composition the thought material duplicated (amounting to 49 per cent between the elementary and secondary

¹ W. J. Osburn, *Overlapping and Omissions in Our Courses of Study*, Public School Publishing Company.

² L. V. Koos, *Study of Duplication of Secondary School and Junior College Material*.

school) consisted largely of definitions and rules of syntax.

In English and science, illustrative material and exercises for the pupils were quite prominent.

In history the condition is quite opposite, "nothing is required of the pupil except patience and a well-developed power of absorption."

"There is a marked absence of material relating to most of the recognized objectives of history teaching."

"The emphasis on thought material is very poorly distributed. The teaching of history seems to be purely a stuffing process."

It is quite evident from the brief reference to these studies that certain core subjects or constants such as English, history, and the social studies, mathematics, science, and to a lesser extent, health and physical education, home-making courses, vocations, and music, are required in the secondary school by State authorization. About the same list is required by city authorities.

The traditional and present practice, then, is towards the continuance of these subjects as the backbone of our educational offerings.

A study of overlapping and omissions in the subject content selected as continuous core subjects at once brings a challenge to the teacher, the curriculum maker, and the administrator.

Some overlapping is to be expected from grade to grade and from unit to higher unit, but one cannot justify the apparent promiscuous overlapping. Neither can one condone the frequent omissions of important materials of instruction.

If we accept as the aim of the junior-high-school and high-school English composition, instruction, such mastery of writing and speaking as will meet the needs of the ordinary man and woman, we still have the problem of so organizing the material that there will be in any one school system an

increasing difficulty of the major topics selected from the seventh grade through the eighth and ninth, and so on through the high school. This means overlapping and reteaching of much material, but in accordance with a well-worked-out plan. The fundamentals stressed in the seventh grade need reviewing and sometimes reteaching in the eighth and ninth grades, etc., and always the teacher should be conscious of the fact that a foundation is being laid for material, well known to the teacher, which is to follow in the lessons immediately ahead.

In the field of the social studies we may teach the Stamp Act in the eighth grade as one of the causes of the Revolutionary War; we may teach it again at a higher level in the ninth grade as one phase of a colonial policy, and in the senior-high-school year it may be again taught as a system of taxation. This illustrates the type of continuous core instruction which should be encouraged.

In the field of general science, which is almost universally taught in the junior high school, we should look for foundations upon which the pupil may safely and easily build in the science fields of biology, physics, and chemistry which are to follow. To illustrate, in the eighth grade we may teach the value of soil enrichment in such a manner as to awaken interest in soil analysis as an interesting chapter in chemistry to be followed by the scientific study of crop fertilization.

In the field of music the pupils are taught to sing, then to read simple music and to sing parts in the seventh and eighth grades, the music compositions becoming more difficult, as each grade is laying a foundation for the more difficult work which is to follow. Music should be a core subject required in all school systems for all pupils from the kindergarten through the high school.

THE SUPPLEMENTARY PROJECT AS A MEANS OF PROVIDING FOR INDIVIDUAL DIFFERENCES

W. C. REAVIS

EDITOR'S NOTE: Professor Reavis, now professor of education at the School of Education, University of Chicago, was for several years principal of the University High School. The plan of enriching school studies which he describes has proved to be very successful. Some of the voluntary projects are completed at a level which would merit credit as term papers in college courses. Superior pupils are enthusiastic in the opportunities which these voluntary projects offer.

C. J. P.

From the beginning of the junior-high-school movement, providing for the individual differences of pupils has been one of the fundamental purposes of the junior high school. Various plans have been tried with more or less success, such as ability grouping, multiple curricula, differentiated assignments, and various types of individual instruction. A plan used in the University of Chicago High School for the past ten years possesses certain features which permit its incorporation into other plans, and which invariably result in better provisions for pupils of the higher ability levels.

Lists of supplementary projects are prepared by the instructors in connection with each of the curriculum units. Pupils who have demonstrated their ability to master the materials of a learning unit before the time reserved for its consideration by their class has elapsed are encouraged to engage in the independent study of some project in the list or some project related to the unit independently conceived as a means of utilizing both their interests and abilities in creative enterprises. This plan makes possible the encouragement of special abilities in the pupils without "side-tracking" their interests from the work of the class and provides a sure specific against loss of interest and the establishment of low-level habits of work caused by holding such pupils to the pace of the class. No pupil, however, is considered eligible to engage in supplemen-

tary projects until the learning unit of the class has been satisfactorily completed. Since every effort is made properly to motivate the learning units, the regular work of a class develops in the pupil of superior ability who has acquired the power to use his capacity efficiently, a momentum that carries the pupil on to the related supplementary projects.

The plan makes possible a means of providing a type of supplementary work for superior pupils which challenges them to discover applications, to extend knowledge, and to acquire appreciations of learning units. The deadening effects of busy-work assignments are eliminated, intellectual independence is encouraged, and a sense of responsibility for intellectual achievement is developed. In the administration of supplementary projects, approval is given by the teacher in the form of a special commendatory report to parents when a project of merit is completed, and in the case of a written project of exceptional worth it is bound and accessioned in the school library. The recognition received acts as an incentive to the pupil to maintain a high standard of work in carrying on supplementary projects. Of course, no approval or commendation is given unless the project actually possesses merit.

Examples of the supplementary project in third-year and fourth-year English have

been presented by McCoy,¹ who used it as a means of measuring the appreciation of pupils. Lists of projects utilized in social science courses have been given by Hill² in a discussion of the use of the supplementary project in providing for superior pupils in the social studies. Types of supplementary projects for the different units in junior-high-school mathematics have been given by Breslich³ in a discussion of the organization of the mathematics course for the seventh, eighth, and ninth grades. In science courses pupils of superior ability are expected to

¹ *Studies in Secondary Education—II* (Supplementary Educational Monographs, No. 26, Department of Education, University of Chicago, 1925), pp. 70-90.

² Twenty-third Yearbook, Part I (National Society for the Study of Education, 1924), pp. 379-388.

³ *Studies in Secondary Education—II* (Supplementary Educational Monographs, No. 26, Department of Education, University of Chicago, 1925), pp. 160-176.

engage in projects of the type suggested by Pieper and Beauchamp⁴ at the end of each unit of work under the caption "Additional Exercises and Projects," and particularly in the "Guide for Additional Study," pages 513 to 573.

The plan described enables an instructor to provide for individual differences on the part of the superior pupils in any group without in any way interfering with the interests or activities of the other pupils of the group. It also has the advantage of encouraging creative work on the part of pupils capable of going beyond minimum essentials and of developing habits of independence and a sense of responsibility for the full and proper use of time.

⁴ *Everyday Problems in Science*, Scott, Foresman & Co., 1925.

BOOK REVIEWS

School Building Programs in American Cities, by N. L. ENGELHARDT (Teachers College, Columbia University Bureau of Publications).

"No system of school administration in any organized school district may be considered adequate in the future unless there has been developed a school-building program which has recognized the many factors of community growth, community need, and community ability to pay, and which has proceeded to build its units in terms of a comprehensive and unified program."

The principle thus expressed in the introduction to Professor Engelhardt's book is the basis of an intensive study of the school-building needs of ten American cities. The recommendations made to the school boards of these ten cities are thus published so that they may serve collectively as a guide to those who are faced with the problem of securing the best possible development of school-building programs through the investment of large sums of the taxpayers' money for the advancing needs of public education.

Among the important problems with which the ten surveys deal are the following:

1. The selection of sites with regard to the desirability of immediate environment and after analysis of population growth and needs.

2. The distribution of buildings to avoid the overlapping of tributary areas.
3. The requirements of the safety and health of children.
4. Adequate provision for health and play programs.
5. The need for determining the size and space relationships of buildings by reference to recent trends in educational thinking and practice.
6. Adequate provision for future additions to buildings.
7. The necessity of foresight in the planning, construction, and location of school buildings, so that they may be serviceable for more than a few years.

The general reader who is interested in the school environment of children will find much to interest and stimulate him in this well-presented study. The school administrator will find it a useful guide.

Public School Plant Program, by ARTHUR B. MOEHLMAN (Rand, McNally and Company, 1929).

Dr. Moehlman presents a thoroughgoing study of the school-building problem in terms of the ultimate objectives of public education, rather than as an isolated factor with only a casual relationship. The basic problem, as stated in the opening

chapter, is to develop a practical and scientific technique for determining the ultimate school-plant needs in any given community. This problem involves three activity aspects: (a) planning to satisfy the needs; (b) making proper provision for the execution of the plan; and (c) appraising objectively the working of the plan. For demonstration it is possible to consider these three phases as separate; in actual practice the process of satisfying school-plant needs must be considered as a progressively continuous cycle of planning, executing, and appraising so long as public education continues.

In carrying out the stated purpose of the book, Dr. Moehlman devotes a chapter to consideration of the question of educational policies with reference to instructional needs, the philosophy of organization, adult community needs, and policies of finance and public relations.

This introduction to the problem is followed by chapters which deal in a detailed and specific way with the procedure leading to the determination of a policy. The various steps in this procedure are determined by four major problems: (a) possible future school-plant requirement; (b) best disposal of present plant; (c) best location of new centers; (d) determination of rate of achievement.

In the closing chapters the problems of executing the school-plant program and appraising the results are dealt with in a similarly complete and thorough way. The illustrative material is plentiful, well-chosen and clearly presented. The book should be very useful to administrators who are confronted with the problem of meeting the demands of increasing school enrollment and of changing community needs.

"Principles of Planning Buildings for Platoon Schools," by HOMER DAVIS (*The Platoon School*, June-July-August, 1929, pp. 53-57).

A discussion of the principles involved in planning school buildings with special emphasis upon the platoon school. The following five principles underlie the planning of school buildings: (1) "The floor plan of a building should be determined by the program of school activities to be operated thereon"; (2) "Due consideration should be given to the provisions of a maximum amount of internal flexibility in a new school building"; (3) "Possibility for future expansion without modification of previous units should be kept at all stages of the development of a building"; (4) "The largest possible proportion of the total floor area should be

devoted to instructional purposes"; and (5) "The aesthetic value of a school building should receive major consideration."

The special features of a platoon school plan are according to the author: (1) home space for teachers, preferably a teacher's office; (2) better toilet and drinking-fountain facilities to expedite the ready transition of pupils; (3) avoidance of centralizing all special activities on one floor or in one wing, thus facilitating the change of pupils; and (4) better playgrounds so that more time may be spent out of doors.¹

"Budgeting Equipment for a New Building," by H. S. GANDERS (*The American School Board Journal*, July, 1929, p. 44).

An argument for careful budgeting of equipment needed in order that the cost of the new building may not consume all the available funds, to the neglect of this most important item. The author calls attention to the inaccuracy of the percentage plan of estimating cost of equipment and advocates careful budgeting based upon the following preliminary steps: (1) the superintendent determines the proper location, size, and type of buildings; (2) the number and type of classrooms, cafeterias, shops, and other units to be equipped; and (3) the decision of the educational staff concerning the educational activities to be carried on in each room.

The superintendent then lists the number and type of all articles of equipment needed for each room to carry out the educational program. A value is given to items of equipment in buildings replaced and those meeting the standards, deducted from the list. The quality level specifications should be used; the Loomis lists of 1925, if no later one has been developed. This should be revised to meet current changes.

The author believes that the budgeting of equipment will result in controlled and directed expenditure, provide sufficient funds when needed, and result in better equipment of buildings at more favorable prices.²

The Opportunity School—Free Instruction for People of All Ages (Denver Public Schools, Monograph Number II, 1926).

This bulletin, prepared by Emily Griffith, the principal and founder of this very significant

¹ Reprinted from *The Teachers Journal and Abstract*, October, 1929.

² Reprinted from *The Teachers Journal and Abstract*, October, 1929.

school, and Superintendent Emeritus W. H. Smiley, is a welcome addition to our too little developed literature of adventures in public education.

"The Denver Opportunity School is undoubtedly one of the most interesting experiments in adult education to be found anywhere in the world," said Superintendent Newlon in the foreword. "The creative leadership of Emily Griffith, her insight into the problems of the individual, her boundless and understanding sympathy, has inspired a faculty with her own feeling and vision."

In this way and *only* in this way are true curriculum innovations consummated anywhere. For only as the heart beats a bit faster does the eye look through today's details and habits and catch the vision of a different curriculum, a more glorious and vital and adventurous school.

P. W. L. C.

Socializing Integrating Activities for Grades VII, VIII, and IX (Curriculum Bulletin, Number 2, Board of Education, St. Louis, Missouri, 1926).

This report was, perhaps, the outstanding innovation which developed in connection with the city-wide teacher-committee curriculum revision in St. Louis, Missouri, in 1926-1927.

"Socializing-integrating activities present life situations rich in possibilities for growth through social adjustments. They grow out of the child's natural interests and needs and offer conditions in which children meet each other in a natural way and in which they can use freedom, that is, the exercise of initiative, spontaneity, independence, and self-control. In allowing children all the opportunities for self-expression that they need, it is necessary, however, to guide them so that their inherent powers will develop along the lines of social and educational values. This guidance must be given by the teacher who must see that the activity is such as will not only appeal directly to the interests and capacities of the group but leads to other activities socially valuable."

After listing the general objectives to the attainment of which these activities may contribute the suggested procedures and desirable outcomes for various student activities are set forth in columns for ten typical specific objectives. In the foreword, the committee explicitly denies that any attempt has been made to suggest all of the activities that might be used or to outline a procedure that should be considered superior to all other methods.

The danger involved in so detailed a program as this lies, however, in the implied restriction of pupil

initiative. For once the pupils take hold of the homeroom, club, assembly, governmental, or general social problems, no man can tell what proposals and experiments and conflicts and competitions will develop. In trying to sail between Scylla and Charybdis, the committee which brought out this report has erred, the reviewer believes, in overemphasizing teacher direction and teacher responsibility for the "success" of projects. Uniform "success," especially if assured by teacher control, may and probably will mean educational failure.

The glory of student activities lies in the fact that they are of, for, and by the students. *Failure should occasionally result* if pupils plan unwisely, decide too hastily, act without due consideration of others' abilities, desires, and prejudices. Nevertheless, had the committee left the detail to be developed by each teacher for herself the report might have veered too far towards abstractions. In any case, we are glad that a curriculum report has been published on student activities. From the point of view of most pupils, these activities form the very core of their curricula. A. D. W.

Vitalizing the High-School Curriculum
(Research Bulletin of the National Education Association, Vol. VII, No. 4, September, 1929).

Following the curriculum yearbooks of the Department of Superintendence and two previous "research bulletins" on the curriculum, there now appears this stimulating and encouraging report. The research directors cite 1,279 high-school course-of-study bulletins, published since 1920, which indicate "the effort which the teaching profession is making to modernize the secondary school," and which are "tangible evidence of the dissatisfaction which school people have with the traditional high-school courses." One-hundred-thirty-two of these bulletins deal with general courses in city, State, and country-school systems; the rest are limited to specific subjects or aspects of the educational program.

Vitalizing the High-School Curriculum presents first the dramatic developments of our industrial civilization and the progress which the high schools have made in three decades in response to our changing civilization, in enrollments, in purposes, in accessibility, in organization, in curriculum and methods, and in the criteria by which each school's success is judged. The picture of the school of 1929 is optimistic; it doubtless represents conditions for which our more progressive secondary-school people are striving. Let us hope that we our-

selves do not accept the picture as an accurate reflection of the typical academic program of current schools. Too much remains to be done for us to take comfort from this flattering estimate.

This is followed by an adequate and much needed summary of the proposals and experimentations for differentiating curricula and methods for pupils of varying levels of ability. It is somewhat disheartening to discover the inertias and superficialities implied in the recommendations of both "experts" and "curriculum committees." Subjects are taken as they have been inherited; how bright and how dull children can best "learn" them seems to be the problem of supreme importance. No positive educational program at the secondary-school level has been set up—so far as this survey shows. It is unfortunate that the challenging adaptations for dull-normal pupils of the Julia Richman, Washington Irving, DeWitt

Clinton, Manhattan Trade, East Side Continuation, James Madison, and other New York City high schools, the South Philadelphia High School for Girls, and doubtless other high schools have apparently escaped the attention of the authors of the bulletin under review.

The major part of this pamphlet is, however, given over to excellent summaries of the research and trends in various high-school subjects, to lists of the best books dealing with curriculum problems, both in the general and in the specific fields, and to the courses of study and programs of studies published since 1920. The report is well documented and contains twenty tables and two charts. It should surely find an important place in every college class and every high-school faculty which expects to deal intelligently with the high-school curriculum.

A. D. W.

BIBLIOGRAPHY OF SCHOOL BUILDINGS, GROUNDS, AND EQUIPMENT

Key:

adv—advertisement
Ag—August
Ap—April
D—December
diag—diagram or diagrams
ed—editorial
F—February
il—illustration or illustrations
Ja—January

Je—June
Jl—July
Mr—March
My—May
N—November
O—October
p—page or pages
pl—plate
S—September
sup—supplement

The following bibliography was compiled from the January, 1928, number of the *Bulletin* of the School of Education, Indiana University. The number lists 2263 titles and is a most valuable bibliography of school buildings, grounds, and equipment. The authors are Henry Lester Smith and Leo Martin Chamberlain.

I. GENERAL REFERENCES

- Allan, Harold A. "Housing the rural school." *Nat. Educ. Assn. J.* 13:321-3 D. 24; plan, il.
General suggestions for the improvement of rural-school architecture.
- Almack, John C., and Bursch, James F. "The school plant and its equipment." In *The administration of consolidated and village schools*, p. 99-137. Houghton Mifflin Co., Boston, 1925.
A general discussion of the problems of rural- and village-school architecture. Emphasis has been placed on the following points: school site, building types, building standards, planning the academic room, teachers' homes.
- Blanton, Annie W., and Borden, L. D. *School grounds, school buildings, and their equipment*.

State of Texas, Department of Education, Bulletin No. 148, Austin, 1922; il., diag., plans, 78 p.

A valuable bulletin covering the following divisions of the subject: school grounds, the building, equipment, sanitation, teachers' cottages. Appendix contains plans for rural-school buildings and explains the Rosenwald Aid Fund.

- Carlton, Charles W. "School architecture." *Am. Sch. J.* 41:7 Sig. 10.
An architect relates the manner in which he has treated the problems of corridors and stairways, foot warmers, ventilation, windows, interior trim, toilets, and cloakrooms.
- Chancellor, William E. "Ten commandments of schoolhouse construction." *American School Hygiene Association (Proceedings of first*

- second, and third congresses) 1909:188-200; plans, il.
- Enumerates ten standards to which the ideal schoolhouse should conform, and emphasizes the importance of the services of a trained school architect.
6. City of New York. *Twenty-seventh annual report of the superintendent of schools. Report on construction and maintenance.* City of New York, Board of Education, New York City, 1925; plans, il., 96 p.
- An outline of progress in schoolhouse construction in New York City. Divisions of special interest are a graphic representation of the distribution of the various items of construction and equipment, the extent of the building program, illustrations and plans of type buildings and building units, and data on maintenance work performed.
7. Collins, D. C. Newman. "The administration of schoolhouse construction." *Am. Sch. Bd. J.* 42:3-4, 52 Ap. '11.
- Recommendations covering the following phases of the subject: utilizing local markets; types of construction; partitions and walls; heating and ventilating; correct theory of economy.
8. Cubberley, Ellwood P. "The teaching equipment." In *Rural life and education*, p. 206-225. Houghton Mifflin Co., Boston, 1914; plans, il.
- Describes the conditions of rural-school architecture and offers recommendations for their improvement. Model rural buildings are shown in plan and illustration.
9. Donovan, John J. "School grounds and school architecture." *Am. Sch. Bd. J.* 51:19-24 N. '15; *Nat. Educ. Assn.* 1915:1041-6; plans, il.
- An interesting address on the following phases of the subject: the playground and its treatment, the classroom, the wardrobe, painting schoolrooms, special rooms, the height of buildings, permanent construction.
10. Fitzgerald, William V. "Building better schools." *Bldg. Age* 46:43-8 Jl. '24; plans, il.
- Discusses the requirements of good school architecture and suggests the responsibilities of the board, the architect, the builder, and the taxpayer.
11. Gompert, William H. "Outstanding essentials of modern school architecture." *Nat. Educ. Assn.* 1924:749-50.
- Reviews the recent school building activities of New York City, and enumerates the outstanding essentials of modern school buildings.
12. Hollister, Horace A. *The planning and construction of high-school buildings.* University of Illinois Bulletin, vol. 14, No. 8, Urbana, Ill., 1916.
- Presents important problems to be considered in planning and constructing high-school buildings.
13. Loring, Charles G. "The small schoolhouse." *Arch. Forum* 43:33-56 Jl. '25; plans, il.
- A general discussion of the essentials of school architecture as applied to buildings of eight rooms or less. Numerous plans and illustrations are included and a table of minimum toilet fixtures is given.
14. National Education Association, Committee on the Reorganization of Secondary Education. "High school buildings and grounds." *U.S. Bur. Educ. Bul.*, No. 23, 1922; plans, il., 49 p.
- A summary of the essentials of construction of high-school buildings. The treatment of each separate phase of the subject is brief, but the discussion together with an excellent series of illustrations and floor plans, furnishes a valuable reference.
15. Rapeer, Louis W. "The classroom of rural and village schools." *School and Home Educ.* 36:228-32 Ap. '17.
- A discussion of the more important phases of rural-school architecture. A list of rather well-established principles is given.
16. Strayer, George D., and Engelhardt, N. L. *School building problems.* Bureau of Publications, Teachers College, Columbia University, New York City, 1927; plans, diag., tables, 697 p.
- Proposes problems covering all important phases of public-school architecture. The book forms a valuable source of information and contains an extensive classified bibliography.
17. Wood, Frank H. "Some defects in schoolhouse planning." *Am. Sch. Bd. J.* 64:35-6 Ja. '22.
- The author points out common defects and offers suggestions for their elimination. Problems considered are: building for the future, the architect, three types of buildings, study of site problem, waste in misplacements, advantageous grouping of rooms.

II. DEVELOPMENT OF THE BUILDING PROGRAM

18. Anderson, Marie. "Curriculum organization and the school plant." *Nat. Educ. Assn.* 1921: 648-9.
- Emphasizes the importance of careful adaptation of the school building to the school organization as a factor in the elimination of waste.
19. Borden, W. W. "Buildings and equipment for junior high schools." *Am. Sch. Bd. J.* 68:47-8 Ap. '24.
- The article presents some fundamental principles to be observed in a junior-high-school building program. The major portion of the

- discussion is given to the following subjects: the curricula which are to be offered, the plan of administration of the school, the community needs which are to be served, centrality as a guide to location, determining size of auditorium, location of special rooms.
20. Bullard, J. E. "Business way of handling school building problem." *Am. Sch. Bd. J.* 64:64, 66, 68, Ja. '22.
Emphasizes the importance of well-planned building programs.
21. Engelhardt, N. L. *A School building program for cities.* Contributions to Education No. 96, Teachers College, Columbia University, New York City, 1918; charts, tables, 130 p.
An excellent review of the underlying principles for developing a school building program. The study is divided into the following main parts: (1) studies in population, (2) studies involving the plant, (3) financing a building program.
22. Hartwell, E. C., and Ittner, William B. "The Buffalo school building program." *Am. Sch. Bd. J.* 62:52-7 F. '21; plans, il.
In this article Mr. Ittner gives an account of the eight-million-dollar building program, while Mr. Hartwell outlines the educational program. Mention is made of the architects' co-operative plan for carrying out the architectural work.
23. Kinkade, Arthur. "The elements of a workable building program." *Am. Sch. Bd. J.* 61: 31-3 Ag. '20.
The following steps in a building program are discussed: inventory of the needs, preparation of the program, sale of plans, financing the undertaking.
24. Lockhart, G. L. *Bond issues and the building program.* Architectural Supply and Publishing Co., 347 Fifth Ave., New York City, 1924; 194 p.
Valuable suggestions on the following points: the architect, his selection and his relation to the board and contractor; preliminary and complete plans, their preparation and contents; the site; the bond sale; publicity, legal requirements, kinds of bonds; construction and equipment.
25. Strayer, George D., Engelhardt, N. L., and others. "School building program." In *Problems in educational administration*, p. 319-24. Bureau of Publications, Teachers College, Columbia University, New York City, 1925; tables, diag.
Proposes as a problem the planning of a building program that will relieve present congestions, provide for a modern school plant, and at the same time not involve greater expenditure than can be secured in a city under consideration. All data relative to population, property valuation, distribution of present facilities, etc., is furnished.
- III. BUILDING SCORE CARDS AND MEASUREMENT.
26. Anderson, C. A. "Tentative score card for elementary desks and seats." *Am. Sch. Bd. J.* 69:46-7 Jl. '24.
The score card is divided into two main parts: types of desks, seats, items. Each division is credited with a total of 50 points. The article includes a copy of the score card and an explanation of its use.
27. Beteille, James O. *Checking schedule for projected school buildings.* Bruce Publishing Co., Milwaukee, Wis., 1919; 32 p.
A valuable guide for school boards and superintendents. Part I calls attention to the items concerning which the architect needs information before he can start plans and specifications. Part II facilitates a rapid check up of finished plans and specifications.
28. Butterworth, Julian E. *Butterworth school building score card for one-teacher school buildings.* World Book Co., Yonkers-on-Hudson, N. Y., 1921; 4 p.
A score card based upon a 1,000-point scale, with 340 points given to classrooms, 80 to other rooms and facilities, 255 to general service equipment, 155 to building in general, and 170 to grounds.
29. Engelhardt, N. L. "The measurement of two elementary schools." *Am. Sch. Bd. J.* 59: 47, 111 O. '19.
Interpretation of the results obtained from the use of the Strayer school building score card, together with conditions found to exist in two elementary buildings in New York City.
30. Reese, L. W. "A score card for selecting the site for a consolidated school." *Am. Sch. Bd. J.* 70:79-80, 130 Ja. '25.
The card provides for 1,000 points divided as follows: accessibility, 320; surroundings, 225; soil, 110; drainage, 115; miscellaneous, 230.
31. Smith, Z. M. *A score card for evaluating architectural service in the planning and constructing of rural school buildings.* Indiana State Department of Public Instruction, Indianapolis (no date given).
A rating scheme based on a total of 2,000 points distributed among the following items: preliminary sketches, contract working drawings, contract specifications, and supervision.
32. Strayer, George D. "Score card for city school building." *NSSE* (Fifteenth Yearbook) 1916: 41-51.
Presents the score card for city school buildings, gives an account of its development, and offers recommendations for its use.

33. Strayer, George D., and Engelhardt, N. L. *A checking list for administrative policies and programs concerned with school housing* (tentative outline). Bureau of Publications, Teachers College, Columbia University, New York City, 1926; 36 p.

A scale of ten points is provided for the checking of all the policies and accomplishments of school boards relating to the building program. The main divisions considered are policies of the board, surveys, the educational program, the building program, the superintendent's statement of needs, the financial program, plans, choice of general plans, specifications, and contracts.

34. Strayer, George D., and Engelhardt, N. L. *The Strayer-Engelhardt score card for city school buildings*. Bureau of Publications, Teachers College, Columbia University, New York City, 1920.

Prepared under five general headings: site, buildings, service system, classrooms, special rooms. Basis for scoring, 1,000 points.

35. *The Strayer-Engelhardt score card for elementary school buildings*. Bureau of Publications, Teachers College, Columbia University, New York City, 1920.

Field record sheets and a score card prepared under five different heads: site, building, service system, classrooms, special rooms. Basis for scoring, 1,000 points.

36. "Strayer-Engelhardt score card for high school buildings." In *Standards for high school buildings*. Bureau of Publications, Teachers College, Columbia University, New York City, 1924.

A total of 1,000 points is distributed as follows: site, 100; building, 155; service systems, 270; classrooms, 145; special rooms, 140; and administration rooms, 50.

IV. ADAPTATIONS OF BUILDING TO SPECIFIC EDUCATIONAL NEEDS

37. Almack, John C. "Class size and efficiency." *Nat. Educ. Assn. J.* 12:107-9 Mr. '23; tables.

Gives the results of a study of class sizes in American and European schools, enumerates the methods that have been used to determine best class size, summarizes the chief studies on the subject, and emphasizes the effect of the cost factor on class size. A bibliography is included.

38. Anderson, Homer Willard. *A method for determining the housing requirements of junior high school programs*. Unpublished doctor's thesis, University of Iowa, Iowa City, 1925; tables, diag., 61 p.

The study may be divided into the following parts: the need for this type of study; a

method for accurately translating the program into building requirements; the relationships which should exist between the capacity of the well-planned, completely filled building and the school program. The author derives a formula for determining the room schedule and ratios for allowance for schedule making and room capacity.

39. Bentley, J. H. "Junior high school buildings." *Nat. Educ. Assn.*, 1922: 400-4.

Describes the general organization of the modern junior high school and suggests the major requirements of a building adapted to such an organization.

40. Challman, Samuel A. "What type of high school building is the best all-around investment?" *Am. Sch. Bd. J.* 57:33-4, N. '18; 45:73, 75 D. '18; 58:28-9, 78; 28-31; 58; 91, 93, Ja., Mr., Ap. '19; plans.

Gives the result of a study to determine the popularity of the following types of building organization: home-desk study room, combined study and recitation room, partial seating study room, and supervised study room.

41. Davis, Jesse B. "High school buildings must be planned for definite needs." *School Life*, 11:184-7, Je. '26; plans, il.

Discusses the steps to be taken in planning a building suited to definite educational needs. Emphasizes space economy and flexibility. Examples of I, H, and E types of school architecture are shown in plan and their merits are discussed.

42. Douglass, Harle R. "Housing the junior high school." *Am. Sch. Bd. J.* 62:33-8, 128-32 Ja. '21; plans, il.

Discusses the special features of buildings adapted to a junior-high-school organization; the questions of housing the junior high school in village, town, and city; purposes of a junior high school, site and grounds, size and organization, type of building, classrooms, special rooms.

43. Lewis, E. E. "Adjusting the junior high school building to the educational program." *J. Educ.* 97:352 Mr. 29, '23.

Enumerates the most important factors to be considered in adjusting a building to a junior-high-school educational program.

44. Spain, Charles L. "Adapting the school plant to the curriculum." *Nat. Educ. Assn.* 1922: 1352.

A brief account of the adaptation of the Detroit building program to the platoon type of organization.

V. PUBLICITY FOR THE BUILDING PROGRAM

45. Alexander, Carter, and Theisen, W. W. "Publicity campaigns for better school support." *J. Educ. Research* 2:457-64 Je. '20.

- Gives the methods used and the results of a study made to determine the principles and procedures underlying the organization and operation of successful school publicity campaigns. A diagrammatic representation of the form of organization desirable for a successful publicity campaign is given, fundamental principles are set up, and a composite campaign is outlined.
46. *American School Board Journal*. "What wins a school bond election?" (ed.) *Am. Sch. Bd. J.* 71:66 O. '25.
Gives an account of a successful school-bond election in Denver, won by a campaign based on absolute frankness on the part of school authorities.
47. Dorsey, Susan M. "How Los Angeles voted \$17,400,000." *Nat. Educ. Assn. J.* 11:273-4 S. '22.
Describes the agencies and methods employed in conducting a successful bond campaign.
48. Irwin, Eugene J. "Graphic presentation of building needs." *Am. Sch. Bd. J.* 74:60, 147-8, Ja. '27; diag.
Considers graphic presentation as a factor in publicity campaigns for school buildings.
49. Reynolds, Rollo G. *Newspaper publicity for the public schools*. Bureau of Publications, Teachers College, Columbia University, New York City, 1922; il., tables, 125 p.
The results of a study made to determine the extent of the use of the daily newspaper for carrying school news. The results appear under the following headings: amount and character of the school news found in the daily papers, school news from the editor's viewpoint, school news from the reader's viewpoint, a program for school-information service.
- ## VI. BUILDING COSTS
50. *American School Board Journal*. "Unit costs of school buildings." *Am. Sch. Bd. J.* 74:60, 162 My '27.
Discusses the advantages and disadvantages of the following bases for estimating unit costs: the cubical-content basis, the square-foot basis, the pupil-capacity basis, the pupil-stations basis, the percentage-of-area basis, the percentage-of-cost basis.
51. Joslin, Arthur W. *Estimating the cost of buildings*. U. P. C. Book Co., Inc., 239 West 39th St., New York City, 1923; diag., plans, 212 p.
The divisions of the book are as follows: reading architects' drawings; masonry, iron-work, marble work, metal work, carpenter work, miscellaneous subcontracts; estimating the cost of building alterations; system in the execution of building contracts; rules for estimating.
52. Maher, James J. "Analysis of cost of a heating and ventilating system for a school building." *Am. Sch. Bd. J.* 67:47-8, Jl. '23.
It is the purpose of this article to emphasize the importance and necessity of a minute analysis of the cost of a heating and ventilating system in a school building. A method by which such an analysis can be made is suggested, and a practical application of it is shown.
53. Fowlkes, John Guy. "Justifying a bond issue for school purposes." *Am. Sch. Bd. J.* 66:49-51 Ap. 23; tables.
The article is largely devoted to the problem of determining the ability of a community to finance a building program. An outline plan for a school-plant survey is given.
54. Smith, Tom K. "How a school district can obtain the best price for its bonds." *Am. Sch. Bd. J.* 70:73-4, 130 Ja. '25.
The article offers suggestions for making school bonds more attractive to buyers. The following points are considered: the arrangement of the maturity of the bonds—whether serial or term issues—the plan of payment of interest and principal, the denomination and registerability of the bonds, the length of time the issue is to run, the purpose of the issues, the tax and debt limits, the physical appearance of the bonds.
55. McCormack, W. R. "Economy in schoolhouse planning and construction." *Nat. Educ. Assn.* 1920:333-5.
Waste space in stairs and corridors and inefficient architectural service are pointed out as problems meriting study, if real economy is to be effected in schoolhouse construction.
- ## VII. LAYOUTS AND EQUIPMENT
56. Koos, Leonard V. "Space-provisions in the floor plans of modern elementary school buildings." *El. School J.* 20:12-25 S. '19; tables.
A careful study of the kinds of space provisions in the floor plans of recently constructed elementary schools. The basis of the study was an examination of 126 floor plans reproduced in the *American School Board Journal* during the decade 1908-1917. The tables and conclusions indicate the relative frequency with which different units are provided, and the tendencies towards increases.
57. "Space-provisions in the floor plans of modern high school buildings." *School R.* 27:573-99 O. '19; tables.
The results of a study to determine the kinds of accommodations provided in modern high-school building and the relative frequency with which these are provided. A complete tabulation of the space provisions of 156 buildings reproduced in the *American School Board Journal* from 1908 to 1917 is given.

58. Terry, Paul W. "Providing adequate housing accommodations for the junior high school." *School R.* 32:13-26 Ja. '24; tables. The results of a study of space accommodations in junior-high-school buildings as indicated by answers to a questionnaire. A complete tabulation of 149 schools is given, and remodeled and designed buildings are contrasted. A table of minimum space accommodations is provided and the various units discussed.
59. Trapp, Daniel V. "The locker in the modern school." *Am. Sch. Bd. J.* 72:72-8; 76-82, 148; 74-8; 73:74, 76 F., Ap., My., Jl. '26; il., plans. Discusses the following: advantages of lockers, types of installations, anchoring, and ventilation. The following types with their advantages are listed: single-tier lockers, double-tier lockers, special gymnasium lockers, box or compartment lockers, storage and stationary cabinets. Specifications, suggestions for purchasing, and directions for installation are given.
60. Crawford, Mary. "The laboratory equipment of the Teacher of English." *English J.* 4:145-51, Mr. '15. Suggestions for equipping the English room. The materials discussed are in the main classified as supplies rather than equipment.
61. Kilpatrick, Van Evrie. "A schoolmaster's idea of a model classroom for elementary schools." *Am. Sch. Bd. J.* 50:16-17, 74 Ap. '15; plans. Suggestions for making the elementary classroom efficient, sanitary, and safe.
62. Kingsley, Clarence D. "Wall equipment and wall treatment for schoolrooms." *Am. Sch. Bd. J.* 74:41-2, 153-4, Ja. '27. Suggestions for properly equipping the walls of a schoolroom in order to care for illumination, visual instruction, storage, cleanliness, temperature control, and communication.
63. *Progressive Education*. "The environment for creative education." *Progressive Educ.* 4:2, Ap., My., Je '27; plans, il. The complete number is devoted to recent developments in providing proper school environment. A series of illustrations and plans suggests possibilities for equipping and laying out the academic and special classroom.
64. Rapeer, Louis W. "The classroom of rural and village schools." *School and Home Educ.* 36:228-32 Ap. '17. Suggested standards on size of classroom, lighting, shades, walls and wall colors, floors, blackboards, platforms and doors, cloakrooms, and basements and drainage.
65. Sampson, Charles H. "The classroom that I would have." *Am. Sch. Bd. J.* 64:61, 139 Je. '22. Considerations for the layout and equipment of a room for the teaching of mathematics.
66. Bailey, Edna W., and Foster, Lawrence F. "A science laboratory and classroom for secondary schools." *Am. Sch. Bd. J.* 66:57-9, 125 Ja. '23; *Gen. Science Q.* 7:257-73 My '23; plans, il. The article describes the science unit in the junior-senior high school at Oakland, Cal. The plant includes laboratory-recitation classroom, science garden, science store rooms, visual education room, darkroom, and department office and library. These various units are described, special attention being given to the combined laboratory-classroom.
67. Brownelle, Herbert, and Wade, Frank B. *The teaching of science and the science teacher*. The Century Co., New York City, 1925; il., plans, 322 p. Laboratory arrangement and equipment—p. 35-44, 243-8, 258-62, 276-9. Finish for tops of laboratory tables—p. 296. Laboratory layouts—p. 297-8.
68. Challman, Samuel A. "Rooms and equipment for a department of agriculture." *Am. Sch. Bd. J.* 66:42-3 Ja. '23; plans. Describes two arrangements for the agriculture department in schools that employ only one instructor. Each of the two plans includes a farm shop, a combined laboratory and recitation room, and a storage room.
69. Frank, J. O. "The laboratory." In *Teaching first-year chemistry*, p. 100-5 (revised edition). Publisher not indicated. 1926. Suggestions on the location, layout, and equipment of the small chemistry laboratory. Cost data are given.
70. Houck, Helen R. "Laboratory work in general science." *Gen. Science Q.* 6:292-5 N. '21. Provides a minimum laboratory equipment list for general science.
71. Laughlin, E. V. "Equipping the physical science laboratory." *Am. Sch. Bd. J.* 64:52 My '22. Discusses in a general way the arrangement, location, and equipment of science laboratories.
72. Monahan, A. C. "High-school science laboratories." *Am. Sch. Bd. J.* 73:54, 170 Jl. '26; il. Outlines the development of science study and discusses the advantages of the "self-contained" science room.
73. U. S. Federal Board for Vocational Education. *Rooms and equipment for the teaching of vocational agriculture in secondary schools*. U. S. Government Printing Office, Washington, 1923; plans, il., 30 p. Considers the location, layout, and equipment of agriculture laboratories and farm

- shops. Floor plans and equipment details are provided.
74. Certain, C. C., and Styles, G. W. "The school library as an architectural problem." *Am. Sch. Bd. J.* 67:40-2, Jl. '23; plans.
- Outlines the problem rather completely, covering the following points: reasons for remodeling, the service of the library, conditions met in remodeling, the architect's service in remodeling, details of the library room. The article is accompanied by typical library layouts.
75. Warren, Irene. "The high school library." *Am. Sch. Bd. J.* 55:22-3, 51-2; 25-6, 77 N., D. '17; plans, il.
- Describes library equipment and suggests a possible equipment layout. Lists several sources of help for individuals responsible for the planning of school libraries.
76. Wilson, Martha. *School library management*. H. W. Wilson Co., New York City, 1919; 150 p.
- Part I considers the school library room; its location, structural features, lighting, size, shelving, capacity, and furniture. A score card for a high-school library equipment and organization is included in the study.
77. Lockhart, G. L. "Auditorium, gymnasium, and study hall combinations." *Natl. Sch. Bldg. J.* 5:184-6, 188, 191-2, Ap. '24; plans, il.
- Advantages and disadvantages of several combinations are discussed.
78. Perry, Clarence Arthur. "Social center ideas in new elementary school architecture." *Am. Sch. Bd. J.* 44:11-15, 53 Ap. '12; plans, il.
- Developments in school architecture resulting from a desire to provide structures which may serve as social centers. The following facilities are considered: the auditorium, the gymnasium, and baths, library rooms, shops, and kitchens, rest rooms, and dispensaries.
79. Akeson, Harold O. "Organization in a general shop." *Ind. Educ. M.* 28:356-9, My '27; plans, il.
- Equipment layout of a general shop of the Elmwood School, East Orange, N. J.
80. Bollinger, J. W. "Some troublesome problems of the finishing room." *Ind. Arts M.* 16:103-5, Mr. '27; plan.
- Detailed recommendations for the construction and equipment of the finishing room. An equipment layout is shown in plan.
81. Challman, Samuel A. "Rooms and equipment for industrial arts." *Am. Sch. Bd. J.* 68:71-5, 132, 135, Ja. '24; *Ind. Arts M.* 13:249-55; 295-302 Jl., Ag. '24; plans, il.
- Suggested limitations for school shops and equipment. The minimum standards set up in
- New York City, Michigan, Minnesota, and Pennsylvania are outlined and illustrated by plans. Typical layouts selected from cities throughout the country are described and illustrated for the following types of shops: the composite shop, mechanical-drawing shop, electrical shop, auto-mechanics shop, wood-working shop, sheet-metal shop, machine shop, print shop.
82. Hall, S. F. "Equipment for a home mechanics course for the junior high school." *Ind. Educ. M.* 27:380-1 My '26.
- Offers a classified equipment list.
83. Slingluff, Ben F. "Junior high school shop layouts and equipment in Philadelphia." *Ind. Educ. M.* 28:310-13 Ap. '27; plans, il.
- Outlines the general objectives of mechanic arts in the junior high school and describes the layout and equipment of the wood shop, general metal shop, and electric shop. The three types of floor layouts are shown in plan.
84. Andrews, Benjamin R. "Equipment for education for the home." In *Education for the home*, p. 41-50 U.S. Bur. Educ. Bul., No. 36, 1914, il., tables.
- Recommendations for the layout and equipment of kitchens, sewing rooms, laundries, and household-arts cottages or apartments. The results of a study of the costs of household-arts equipment in elementary and high schools are given.
85. Schermerhorn, Grace. "Equipment in elementary and junior high schools." *J. Home Econ.* 14:320-1, Jl. '22; plan.
- Shows the layout of home-activities department in the elementary and junior high schools of New York City.
86. Hart, Winifred. "Cafeterias, their management and equipment." *Am. Sch. Bd. J.* 75:54, 146, 149, Ag. '27.
- Discusses the planning of the cafeteria, its equipment, and the relative merits of different plans of operation.
87. Dickey, C. W. "Physical education plants for public schools." *Nation's Health* 3:62-30, N. '21; plans.
- Describes provisions made for physical education in the Oakland (Cal.) schools.
88. Grater, Clyde O. *Construction and equipment of Indiana high school gymsnasiums*. Unpublished master's thesis, Indiana University, Library, 1926; plans, diag., tables, 105 p.
- Among the problems studied are size and location of site, number owning gymnasiums, by whom financed, dates of construction, cost, dimensions, materials, heating and ventilation, lighting, fire equipment, apparatus, provisions for basketball, and capacity. Data were secured by means of a questionnaire.

9. Batchelor, W. C. "Swimming pool construction." *Am. City* 34:417-20, Ap. '26; plans. Outlines the specifications for a municipal pool at Fort Worth, Texas. The advantages of each feature of the pool are enumerated, and a table of construction costs is furnished. While the features described in the article apply to an outdoor pool, many of them are adaptable to indoor construction.
10. Lockhart, G. L. "Correctly designed swimming-pools." *Natl. Sch. Bldg. J.* 5:16, 28-38, Ja. '24; plans. A valuable article suggesting standards for arrangement and equipment of swimming-pools. The construction of a pool is described as is the mechanical equipment necessary for heating, filtration, and sterilization.
11. Tew, Joseph Gardner. "Making swimming-pools safe." *Nat. Educ. Assn. J.* 13:141-2, Ap. '24; il. Lists seven methods employed to accomplish disinfection of swimming pools, and considers the relative merits of these methods.
12. Kingsley, Clarence D. "Some features of administrative rooms in school buildings." *Am. Sch. Bd. J.* 75:38 Ag. '27. Outlines the administrative and supervisory functions for which provisions must be made in the building.
13. Betelle, James O. "Some details of schoolhouse planning." *Am. Sch. Bd. J.* 54:34 Je. '17; il. A brief discussion of model music rooms and provisions for moving-picture booths in school auditoriums.
14. Anderson, C. A. "The problem of classroom seating." *Am. Sch. Bd. J.* 70:87-9, 126 Ja. '25; diag., plans. Traces the historical development of school seats and seating, gives the advantages and disadvantages of different seating arrangement, and indicates some of the general principles that should be followed.
15. Bennett, Henry Eastman. "The buying of school equipment." *Am. Sch. Bd. J.* 74:90-1, 140 Ja. '27. The article elaborates on the following principles of equipment buying: the relation of price and quality, a fixed budget for equipment, advantages of early buying, expert buying in an open market as opposed to the unbusinesslike policy of sealed bids.
16. Redfield, R. P. "Buildings and equipment for junior high schools." *Midlands Schools* 40:175, 182 F. '26. General principles governing the selection of equipment for the junior high school.
17. McClure, Abbot. *Making floors*. McBride, Nast and Co., New York City, 1915; diag., il., 64 p. A guide for the owner or person responsible for superintendence of building construction. The work has specific reference to dwellings, but is applicable to other types of buildings: concrete, tile, mosaic, stone, and brick floors; wooden floors, new and remade; patent composition, and miscellaneous floors; floor finishes and the care of floors.
18. Hart, F. W., and Peterson, L. H. "Economics in schoolhousing." *Am. Sch. Bd. J.* 73:42, 153 Jl. '26; 74:65-6, 154 My '27; tables. A study of pupil use of blackboards in junior and senior high schools with recommendations for the elimination of unused portions of such space.
19. Lockhart, G. L. "Manufactured blackboards." *Natl. Sch. Bldg. J.* 6:60-2, 76-8, 82-6 F. '25; detail drawings. Discusses qualities of materials used for blackboards. Specifications and detail drawings for the construction of different types are given.
20. Alt, Harold L. *Mechanical equipment of school buildings*. The Bruce Publishing Co., Milwaukee, Wis., 1916; plans, il., diag., 111 p. The following outline indicates the chief subjects treated: heating and ventilating, toilet fixtures and plumbing, the water supply, sewage disposal, fire protection, electrical equipment, swimming-pools and their equipment, vacuum cleaning.
21. "The pros and cons of school ventilation." *Am. Sch. Bd. J.* 74:63-4, 148-50; 49-50, 134, 136 Ja., F. '27; diag. Discusses the advantages and disadvantages of fan and duct systems, open-window ventilation, and the unit ventilator system. The article represents a defense of fan and duct systems.
22. *American School Board Journal*. "The Big issue in schoolhouse ventilation." *Am. Sch. Bd. J.* 74:61-2, 141-2 Mr. '27; table. The opinions of experts on schoolroom ventilation as expressed at the recent convention of the American Society of Heating and Ventilating Engineers. This article represents a valuable and up-to-date summary of the most important phases of the subject.
23. Anderson, H. W. "The intermediate or junior high school in Detroit." *Am. Soc. Heat V. E. J.* 28:618-36, S. '22; plans, il. Emphasizes the importance of educational specifications in the planning of a school building, and outlines the steps followed in the development of plans for the Detroit intermediate schools. The heating and ventilating system is described in some detail.
24. *Heating and Ventilating Magazine*. "Simple rules for cutting heating costs." *Heat and Ven.* 23:69 Ja. '26.

- A reduction of 33 1/3 per cent in fuel costs for heating and ventilating the Portland (Ore.) public schools by means of a daily record of the heating-plant operation.
105. State of New York, State Commission on Ventilation. *Ventilation*. E. P. Dutton & Co., 681 Fifth Ave., New York City, 1923; tables, diag., il., 620 p.
- A detailed report of the research work and experimentation of a committee of experts on ventilation. The report is divided into two major headings, as follows: a study of the physiological significance of the various factors in ventilation with special reference to the effects of air conditions on health, comfort, and efficiency; a study of the practical results achieved by the use of various methods of schoolroom ventilation.
106. Pleins, Leo H. "Sanitary fixtures for school buildings." *Am. Sch. Bd. J.* 40:16-17, 38 Ap. '10; diag., il.
- Recommendations and suggested standards for toilet and lavatory fixtures, showers, and drinking fountains.
107. Burrows, Mark. "Sanitation in the rural school." *Teaching* 2:16-18 Ja. 15 '16; diag.
- Describes a water-supply system for a rural school and offers brief suggestions on toilet provisions, heating, and ventilating.
108. Towner, William T. "Modern methods of sewage disposal in rural country and city schools." *International Congress on School Hygiene* 2:48-53 '13.
- Emphasizes the importance of proper sewage disposal, and describes two effective methods: the hygienic bacterial system, the incinerating system.
109. Beal, A. F. "Some factors affecting daylight lighting of interiors." *Illum. Eng. Soc.* 22: 276-97, 298-301 Mr. '27; diag.
- A study of the influence of clouds upon inside illumination, outside illumination, and sky brightness, together with data showing that the inside-outside ratio is not constant, but that it has at least three laws of change.
110. Reid, Kirk M. "School lighting." *Am. Sch. Bd. J.* 70:47-8, 148, 151 My '25; il.
- Considers the problem of artificial lighting of schoolrooms. The following topics are considered: present conditions, lighting economies, simplified specifications on proper lighting for classrooms.
111. Spaulding, H. T., and Palmer, R. A. "Artificial lighting system in the schools." *Am. Sch. Bd. J.* 64:41-4, 139 Je. '22; il., diag.
- Considers the importance of good lighting, the relation of inadequate lighting and defective visions, the elimination of glare, relative advantages of different systems, the effect of shadows, minimum standards, location of light sources, the size of lamps, and the importance of proper maintenance. A table shows the relative effectiveness of different types of shades and reflectors.
112. Cooley, M. S. "Vacuum cleaning systems in schools." *Am. Sch. Bd. J.* 57:27-9, 73-4 S. '18; il.
- The advantages and economies of a vacuum system are discussed. The parts that go to make up a system are described and specifications for a first-class installation are given.
113. Reeves, Charles Everand. "The work of the school janitor." *Am. Sch. Bd. J.* 70:48, 150; 71:48, 135, 136; 47-8; 51-2, 140; 65-7, 136-8; 55-6, 133-4, 137; 55-6, 129-30 Ja., Jl., Ag., S., O., N., D. '25; 72-65-6 Mr. '26.
- Considers materials and methods to be employed in the cleaning and treatment of floors, in dusting, in scrubbing and mopping, in cleaning of blackboards, erasers, and miscellaneous equipment, and in caring for heating and ventilating systems.
114. *American School Board Journal*. "The safeguarding of existing school buildings against fire." *Am. Sch. Bd. J.* 54:26-8 F. '17.
- A report of the International Association of Fire Engineers containing many valuable suggestions.
115. Cooper, Frank Irving. "The planning of schoolhouses against the fire hazard." *International Congress on School Hygiene* 2:39-6 '13; *Am. Sch. Bd. J.* 47:14-15, 40-1 S. '13; plans.
- Suggested standards for fire protection in schoolhouses of second-class construction.
116. Crosby, Everett U.; Fiske, Henry A.; and Forster, H. Walter. *Hand-book of fire protection* (seventh edition). D. Van Nostrand Co., New York City, 1924; plans, tables, diag., il., 900 p.
- A complete guide to general principles of fire protection, causes of fire, building construction, and extinguishing of fire. The fire-resistive properties of various building materials are discussed.